

This Page Is Inserted by IFW Operations  
and is not a part of the Official Record

## **BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning documents *will not* correct images,  
please do not report the images to the  
Image Problem Mailbox.**

SEQUENCE LISTING

5 <110> Lyamichev, Victor  
 <120> CHARGE TAGS AND SEPARATION OF NUCLEIC ACID MOLECULES  
 <130> FORS 4912  
 <160> 85  
 <170> PatentIn version 3.0

10 <210> 1  
 <211> 23  
 <212> DNA

15 <213> synthetic  
 <220>  
 <221> misc\_feature  
 <222> (1)..(2)

20 <223> misc. feature  
 <400> 1

25 tntctttttca ccagcgagac ggg 23  
 <210> 2  
 <211> 22  
 <212> DNA  
 <213> synthetic  
 <400> 2

30 attgggcgcc aggggtggttt tt 22  
 <210> 3  
 <211> 30  
 <212> DNA  
 <213> synthetic  
 <400> 3

35 caggggtgaag ggaagaagaa agcgaaaggt 30  
 <210> 4  
 <211> 30  
 <212> DNA  
 <213> synthetic  
 <400> 4

40 caggggggaag ggaagaagaa agcgaaaggt 30  
 <210> 5  
 <211> 28  
 <212> DNA  
 <213> synthetic

55  
 60

<400> 5  
 cacgaattcc gaggcgatgc ttccgctc 28  
 5  
 <210> 6  
 <211> 30  
 10 <212> DNA  
 <213> synthetic  
 <400> 6  
 15 tcgacgtcga ctaacccttg gcggaaagcc 30  
 <210> 7  
 20 <211> 23  
 <212> DNA  
 25 <213> synthetic  
 <400> 7  
 gcacgcctc ggaattcatg gtc 23  
 30  
 <210> 8  
 <211> 836  
 35 <212> PRT  
 <213> Thermus thermophilus  
 40 <400> 8  
 Met Asn Ser Glu Ala Met Leu Pro Leu Phe Glu Pro Lys Gly Arg Val  
 1 5 10 15  
 45 Leu Leu Val Asp Gly His His Leu Ala Tyr Arg Thr Phe Phe Ala Leu  
 20 25 30  
 Lys Gly Leu Thr Thr Ser Arg Gly Glu Pro Val Gln Ala Val Tyr Gly  
 35 40 45  
 50 Phe Ala Lys Ser Leu Leu Lys Ala Leu Lys Glu Asp Gly Tyr Lys Ala  
 50 55 60  
 Val Phe Val Val Phe Asp Ala Lys Ala Pro Ser Phe Arg His Glu Ala  
 65 70 75 80  
 55 Tyr Glu Ala Tyr Lys Ala Gly Arg Ala Pro Thr Pro Glu Asp Phe Pro  
 85 90 95  
 60 Arg Gln Leu Ala Leu Ile Lys Glu Leu Val Asp Leu Leu Gly Phe Thr  
 100 105 110

	Arg	Leu	Glu	Val	Pro	Gly	Tyr	Glu	Ala	Asp	Asp	Val	Leu	Ala	Thr	Leu
			115					120					125			
5	Ala	Lys	Lys	Ala	Glu	Lys	Glu	Gly	Tyr	Glu	Val	Arg	Ile	Leu	Thr	Ala
		130					135					140				
	Asp	Arg	Asp	Leu	Tyr	Gln	Leu	Val	Ser	Asp	Arg	Val	Ala	Val	Leu	His
	145					150					155					160
10	Pro	Glu	Gly	His	Leu	Ile	Thr	Pro	Glu	Trp	Leu	Trp	Glu	Lys	Tyr	Gly
					165					170					175	
	Leu	Arg	Pro	Glu	Gln	Trp	Val	Asp	Phe	Arg	Ala	Leu	Val	Gly	Asp	Pro
				180					185					190		
15	Ser	Asp	Asn	Leu	Pro	Gly	Val	Lys	Gly	Ile	Gly	Glu	Lys	Thr	Ala	Leu
			195					200					205			
20	Lys	Leu	Leu	Lys	Glu	Trp	Gly	Ser	Leu	Glu	Asn	Leu	Leu	Lys	Asn	Leu
		210					215					220				
	Asp	Arg	Val	Lys	Pro	Glu	Asn	Val	Arg	Glu	Lys	Ile	Lys	Ala	His	Leu
	225					230					235					240
25	Glu	Asp	Leu	Arg	Leu	Ser	Leu	Glu	Leu	Ser	Arg	Val	Arg	Thr	Asp	Leu
					245					250					255	
	Pro	Leu	Glu	Val	Asp	Leu	Ala	Gln	Gly	Arg	Glu	Pro	Asp	Arg	Glu	Gly
				260					265					270		
30	Leu	Arg	Ala	Phe	Leu	Glu	Arg	Leu	Glu	Phe	Gly	Ser	Leu	Leu	His	Glu
			275					280					285			
	Phe	Gly	Leu	Leu	Glu	Ala	Pro	Ala	Pro	Leu	Glu	Glu	Ala	Pro	Trp	Pro
		290					295					300				
35	Pro	Pro	Glu	Gly	Ala	Phe	Val	Gly	Phe	Val	Leu	Ser	Arg	Pro	Glu	Pro
	305					310					315					320
40	Met	Trp	Ala	Glu	Leu	Lys	Ala	Leu	Ala	Ala	Cys	Arg	Asp	Gly	Arg	Val
					325					330					335	
	His	Arg	Ala	Ala	Asp	Pro	Leu	Ala	Gly	Leu	Lys	Asp	Leu	Lys	Glu	Val
				340					345					350		
45	Arg	Gly	Leu	Leu	Ala	Lys	Asp	Leu	Ala	Val	Leu	Ala	Ser	Arg	Glu	Gly
			355					360					365			
50	Leu	Asp	Leu	Val	Pro	Gly	Asp	Asp	Pro	Met	Leu	Leu	Ala	Tyr	Leu	Leu
		370					375					380				
	Asp	Pro	Ser	Asn	Thr	Thr	Pro	Glu	Gly	Val	Ala	Arg	Arg	Tyr	Gly	Gly
	385					390					395					400
55	Glu	Trp	Thr	Glu	Asp	Ala	Ala	His	Arg	Ala	Leu	Leu	Ser	Glu	Arg	Leu
					405					410					415	
	His	Arg	Asn	Leu	Leu	Lys	Arg	Leu	Glu	Gly	Glu	Glu	Lys	Leu	Leu	Trp
				420					425					430		
60	Leu	Tyr	His	Glu	Val	Glu	Lys	Pro	Leu	Ser	Arg	Val	Leu	Ala	His	Met
			435					440					445			

	Glu	Ala	Thr	Gly	Val	Arg	Arg	Asp	Val	Ala	Tyr	Leu	Gln	Ala	Leu	Ser
	450						455					460				
5	Leu	Glu	Leu	Ala	Glu	Glu	Ile	Arg	Arg	Leu	Glu	Glu	Glu	Val	Phe	Arg
	465					470					475					480
	Leu	Ala	Gly	His	Pro	Phe	Asn	Leu	Asn	Ser	Arg	Asp	Gln	Leu	Glu	Arg
					485					490					495	
10	Val	Leu	Phe	Asp	Glu	Leu	Arg	Leu	Pro	Ala	Leu	Gly	Lys	Thr	Gln	Lys
				500					505					510		
	Thr	Gly	Lys	Arg	Ser	Thr	Ser	Ala	Ala	Val	Leu	Glu	Ala	Leu	Arg	Glu
			515					520					525			
15	Ala	His	Pro	Ile	Val	Glu	Lys	Ile	Leu	Gln	His	Arg	Glu	Leu	Thr	Lys
		530					535					540				
20	Leu	Lys	Asn	Thr	Tyr	Val	Asp	Pro	Leu	Pro	Ser	Leu	Val	His	Pro	Arg
	545					550					555					560
	Thr	Gly	Arg	Leu	His	Thr	Arg	Phe	Asn	Gln	Thr	Ala	Thr	Ala	Thr	Gly
					565					570						575
25	Arg	Leu	Ser	Ser	Ser	Asp	Pro	Asn	Leu	Gln	Asn	Ile	Pro	Val	Arg	Thr
				580					585					590		
	Pro	Leu	Gly	Gln	Arg	Ile	Arg	Arg	Ala	Phe	Val	Ala	Glu	Ala	Gly	Trp
			595					600					605			
30	Ala	Leu	Val	Ala	Leu	Asp	Tyr	Ser	Gln	Ile	Glu	Leu	Arg	Val	Leu	Ala
		610					615					620				
	His	Leu	Ser	Gly	Asp	Glu	Asn	Leu	Ile	Arg	Val	Phe	Gln	Glu	Gly	Lys
35		625				630					635					640
	Asp	Ile	His	Thr	Gln	Thr	Ala	Ser	Trp	Met	Phe	Gly	Val	Pro	Pro	Glu
					645					650					655	
40	Ala	Val	Asp	Pro	Leu	Met	Arg	Arg	Ala	Ala	Lys	Thr	Val	Asn	Phe	Gly
				660					665					670		
	Val	Leu	Tyr	Gly	Met	Ser	Ala	His	Arg	Leu	Ser	Gln	Glu	Leu	Ala	Ile
			675					680					685			
45	Pro	Tyr	Glu	Glu	Ala	Val	Ala	Phe	Ile	Glu	Arg	Tyr	Phe	Gln	Ser	Phe
		690					695					700				
50	Pro	Lys	Val	Arg	Ala	Trp	Ile	Glu	Lys	Thr	Leu	Glu	Glu	Gly	Arg	Lys
	705					710					715					720
	Arg	Gly	Tyr	Val	Glu	Thr	Leu	Phe	Gly	Arg	Arg	Arg	Tyr	Val	Pro	Asp
					725					730					735	
55	Leu	Asn	Ala	Arg	Val	Lys	Ser	Val	Arg	Glu	Ala	Ala	Glu	Arg	Met	Ala
				740					745					750		
	Phe	Asn	Met	Pro	Val	Gln	Gly	Thr	Ala	Ala	Asp	Leu	Met	Lys	Leu	Ala
			755					760					765			
60	Met	Val	Lys	Leu	Phe	Pro	Arg	Leu	Arg	Glu	Met	Gly	Ala	Arg	Met	Leu
		770					775					780				

Leu Gln Val His Asp Glu Leu Leu Leu Glu Ala Pro Gln Ala Arg Ala  
 785 790 795 800  
 Glu Glu Val Ala Ala Leu Ala Lys Glu Ala Met Glu Lys Ala Tyr Pro  
 5 805 810 815  
 Leu Ala Val Pro Leu Glu Val Glu Val Gly Met Gly Glu Asp Trp Leu  
 820 825 830  
 10 Ser Ala Lys Gly  
 835  
 <210> 9  
 15 <211> 2511  
 <212> DNA  
 20 <213> *Thermus thermophilus*  
 <400> 9  
 atgaattccg aggcgatgct tccgctcttt gaacccaaag gccgggtcct cctggtggac 60  
 25 ggccaccacc tggcctaccg caccttcttc gccctgaagg gcctcaccac gagccggggc 120  
 gaaccggtgc aggcggtcta cggcttcgcc aagagcctcc tcaaggccct gaaggaggac 180  
 30 ggggtacaagg ccgtcttcgt ggtctttgac gccaaaggccc cctccttcctg ccacgaggcc 240  
 tacgaggcct acaaggcggg gagggccccg acccccaggg acttcccccg gcagctcgcc 300  
 ctcatcaagg agctggtgga cctcctgggg tttacccgcc tcgaggtccc cggctacgag 360  
 35 gcggacgacg ttctcgccac cctggccaag aaggcggaag aggaggggta cgaggtgcgc 420  
 atcctcaccg ccgaccgca cctctaccaa ctctctccg accgcgtcgc cgtcctccac 480  
 40 cccgagggcc acctcatcac cccggagtgg ctttgggaga agtacggcct caggccggag 540  
 cagtgggtgg acttcgcgc cctcgtgggg gaccctccg acaacctccc cggggtcaag 600  
 ggcatcgggg agaagaccgc cctcaagctc ctcaaggagt ggggaagcct ggaaaacctc 660  
 45 ctcaagaacc tggaccgggt aaagccagaa aacgtccggg agaagatcaa ggcccacctg 720  
 gaagacctca ggctctcctt ggagctctcc cgggtgcgca ccgacctccc cctggagggtg 780  
 50 gacctcggcc aggggcggga gcccgaccgg gaggggctta gggccttcct ggagaggctg 840  
 gagttcggca gcctcctcca cgagttcggc ctcttgagg ccccgcccc cctggaggag 900  
 gcccctggc ccccgccgga aggggccttc gtgggcttcg tcctctcccg ccccgagccc 960  
 55 atgtgggagg agcttaaagc cctggccgcc tgcaggagc gccgggtgca ccgggcagca 1020  
 gacccttg cggggctaaa ggacctcaag gaggtccggg gcctcctcgc caaggacctc 1080  
 60 gccgtcttg cctcgaggga ggggctagac ctctgcccc gggacgacct catgctcctc 1140  
 gcctacctcc tggacctc caacaccacc cccgaggggg tggcgcgggc ctacgggggg 1200

	gagtggacgg	aggacgccgc	ccaccggggc	ctcctctcgg	agaggctcca	tcggaacctc	1260
	cttaagcgcc	tcgaggggga	ggagaagctc	ctttggctct	accacgaggt	ggaaaagccc	1320
5	ctctcccggg	tcctggccca	catggaggcc	accggggtag	ggcgggacgt	ggcctacctt	1380
	caggcccttt	ccctggagct	tgcggaggag	atccgccgcc	tcgaggagga	ggtcttccgc	1440
10	ttggcgggcc	accccttcaa	cctcaactcc	cgggaccagc	tggaaagggg	gctctttgac	1500
	gagcttaggc	ttcccgccct	ggggaagacg	caaaagacag	gcaagcgctc	caccagcgcc	1560
	gcggtgctgg	aggccctacg	ggaggcccac	cccatcgtag	agaagatcct	ccagcaccgg	1620
15	gagctcacca	agctcaagaa	cacctacgtg	gacccctccc	caagcctcgt	ccaccgagg	1680
	acggggccgc	tccacacccg	cttcaaccag	acggccacgg	ccacggggag	gcttagtagc	1740
20	tccgacccca	acctgcagaa	catccccgtc	cgcacccctt	tgggcccagag	gatccgccc	1800
	gccttcgtgg	ccgaggcggg	ttgggcggtg	gtggccctgg	actatagcca	gatagagctc	1860
	cgcgtcctcg	cccacctctc	cggggacgaa	aacctgatca	gggtcttcca	ggaggggaag	1920
25	gacatccaca	cccagaccgc	aagctggatg	ttcggcgctc	ccccggaggc	cgtggacccc	1980
	ctgatgcgcc	gggcggccaa	gacggtgaac	ttcggcgctc	tctacggcat	gtccgcccac	2040
30	aggctctccc	aggagcttgc	catcccctac	gaggaggcgg	tggcctttat	agagcgctac	2100
	ttccaaagct	ttcccaaggt	gcgggcctgg	atagaaaaga	ccctggagga	ggggaggaag	2160
	cggggctacg	tggaaaccct	cttcggaaga	aggcgctacg	tgcccgacct	caacgcccgg	2220
35	gtgaagagcg	tcagggaggc	cgcggagcgc	atggccttca	acatgcccgt	ccagggcacc	2280
	gccgccgacc	tcatgaagct	cgccatgggt	aagctcttcc	ccgcctccg	ggagatgggg	2340
40	gcccgcagtc	tcctccaggt	ccacgacgag	ctcctcctgg	aggcccccca	agcgcgggcc	2400
	gaggaggtgg	cggctttggc	caaggaggcc	atggagaagg	cctatcccct	cgcctgccc	2460
	ctggaggtgg	aggtggggat	gggggaggac	tggctttccg	ccaagggtta	g	2511
45	<210> 10						
	<211> 26						
50	<212> DNA						
	<213> synthetic						
	<400> 10						
55	caggaggagc	tcgttgtgga	cctgga				26
60	<210> 11						
	<211> 836						

<212> PRT

<213> Thermus thermophilus

5 <400> 11

	Met	Asn	Ser	Glu	Ala	Met	Leu	Pro	Leu	Phe	Glu	Pro	Lys	Gly	Arg	Val	
	1				5					10					15		
10	Leu	Leu	Val	Asp	Gly	His	His	Leu	Ala	Tyr	Arg	Thr	Phe	Phe	Ala	Leu	
				20					25					30			
	Lys	Gly	Leu	Thr	Thr	Ser	Arg	Gly	Glu	Pro	Val	Gln	Ala	Val	Tyr	Gly	
			35					40					45				
15	Phe	Ala	Lys	Ser	Leu	Leu	Lys	Ala	Leu	Lys	Glu	Asp	Gly	Tyr	Lys	Ala	
	50						55					60					
20	Val	Phe	Val	Val	Phe	Asp	Ala	Lys	Ala	Pro	Ser	Phe	Arg	His	Glu	Ala	
	65					70					75					80	
	Tyr	Glu	Ala	Tyr	Lys	Ala	Gly	Arg	Ala	Pro	Thr	Pro	Glu	Asp	Phe	Pro	
					85					90					95		
25	Arg	Gln	Leu	Ala	Leu	Ile	Lys	Glu	Leu	Val	Asp	Leu	Leu	Gly	Phe	Thr	
				100					105					110			
	Arg	Leu	Glu	Val	Pro	Gly	Tyr	Glu	Ala	Asp	Asp	Val	Leu	Ala	Thr	Leu	
			115					120					125				
30	Ala	Lys	Lys	Ala	Glu	Lys	Glu	Gly	Tyr	Glu	Val	Arg	Ile	Leu	Thr	Ala	
		130					135					140					
	Asp	Arg	Asp	Leu	Tyr	Gln	Leu	Val	Ser	Asp	Arg	Val	Ala	Val	Leu	His	
35	145					150				155						160	
	Pro	Glu	Gly	His	Leu	Ile	Thr	Pro	Glu	Trp	Leu	Trp	Glu	Lys	Tyr	Gly	
				165						170					175		
40	Leu	Arg	Pro	Glu	Gln	Trp	Val	Asp	Phe	Arg	Ala	Leu	Val	Gly	Asp	Pro	
				180					185					190			
	Ser	Asp	Asn	Leu	Pro	Gly	Val	Lys	Gly	Ile	Gly	Glu	Lys	Thr	Ala	Leu	
			195					200					205				
45	Lys	Leu	Leu	Lys	Glu	Trp	Gly	Ser	Leu	Glu	Asn	Leu	Leu	Lys	Asn	Leu	
		210					215					220					
	Asp	Arg	Val	Lys	Pro	Glu	Asn	Val	Arg	Glu	Lys	Ile	Lys	Ala	His	Leu	
50	225					230					235					240	
	Glu	Asp	Leu	Arg	Leu	Ser	Leu	Glu	Leu	Ser	Arg	Val	Arg	Thr	Asp	Leu	
					245					250					255		
55	Pro	Leu	Glu	Val	Asp	Leu	Ala	Gln	Gly	Arg	Glu	Pro	Asp	Arg	Glu	Gly	
				260					265					270			
	Leu	Arg	Ala	Phe	Leu	Glu	Arg	Leu	Glu	Phe	Gly	Ser	Leu	Leu	His	Glu	
			275					280					285				
60	Phe	Gly	Leu	Leu	Glu	Ala	Pro	Ala	Pro	Leu	Glu	Glu	Ala	Pro	Trp	Pro	
		290					295					300					



	Pro	Pro	Glu	Gly	Ala	Phe	Val	Gly	Phe	Val	Leu	Ser	Arg	Pro	Glu	Pro	
	305					310					315					320	
5	Met	Trp	Ala	Glu	Leu	Lys	Ala	Leu	Ala	Ala	Cys	Arg	Asp	Gly	Arg	Val	
					325					330					335		
	His	Arg	Ala	Ala	Asp	Pro	Leu	Ala	Gly	Leu	Lys	Asp	Leu	Lys	Glu	Val	
				340					345					350			
10	Arg	Gly	Leu	Leu	Ala	Lys	Asp	Leu	Ala	Val	Leu	Ala	Ser	Arg	Glu	Gly	
			355					360					365				
	Leu	Asp	Leu	Val	Pro	Gly	Asp	Asp	Pro	Met	Leu	Leu	Ala	Tyr	Leu	Leu	
15		370					375					380					
	Asp	Pro	Ser	Asn	Thr	Thr	Pro	Glu	Gly	Val	Ala	Arg	Arg	Tyr	Gly	Gly	
	385					390					395					400	
	Glu	Trp	Thr	Glu	Asp	Ala	Ala	His	Arg	Ala	Leu	Leu	Ser	Glu	Arg	Leu	
20					405					410					415		
	His	Arg	Asn	Leu	Leu	Lys	Arg	Leu	Glu	Gly	Glu	Glu	Lys	Leu	Leu	Trp	
				420					425					430			
25	Leu	Tyr	His	Glu	Val	Glu	Lys	Pro	Leu	Ser	Arg	Val	Leu	Ala	His	Met	
			435					440					445				
	Glu	Ala	Thr	Gly	Val	Arg	Arg	Asp	Val	Ala	Tyr	Leu	Gln	Ala	Leu	Ser	
30		450					455					460					
	Leu	Glu	Leu	Ala	Glu	Glu	Ile	Arg	Arg	Leu	Glu	Glu	Glu	Val	Phe	Arg	
	465					470					475					480	
	Leu	Ala	Gly	His	Pro	Phe	Asn	Leu	Asn	Ser	Arg	Asp	Gln	Leu	Glu	Arg	
35					485					490					495		
	Val	Leu	Phe	Asp	Glu	Leu	Arg	Leu	Pro	Ala	Leu	Gly	Lys	Thr	Gln	Lys	
				500					505					510			
40	Thr	Gly	Lys	Arg	Ser	Thr	Ser	Ala	Ala	Val	Leu	Glu	Ala	Leu	Arg	Glu	
			515					520					525				
	Ala	His	Pro	Ile	Val	Glu	Lys	Ile	Leu	Gln	His	Arg	Glu	Leu	Thr	Lys	
		530					535					540					
45	Leu	Lys	Asn	Thr	Tyr	Val	Asp	Pro	Leu	Pro	Ser	Leu	Val	His	Pro	Arg	
	545					550					555					560	
	Thr	Gly	Arg	Leu	His	Thr	Arg	Phe	Asn	Gln	Thr	Ala	Thr	Ala	Thr	Gly	
50					565					570					575		
	Arg	Leu	Ser	Ser	Ser	Asp	Pro	Asn	Leu	Gln	Asn	Ile	Pro	Val	Arg	Thr	
				580					585					590			
55	Pro	Leu	Gly	Gln	Arg	Ile	Arg	Arg	Ala	Phe	Val	Ala	Glu	Ala	Gly	Trp	
			595					600					605				
	Ala	Leu	Val	Ala	Leu	Asp	Tyr	Ser	Gln	Ile	Glu	Leu	Arg	Val	Leu	Ala	
		610					615					620					
60	His	Leu	Ser	Gly	Asp	Glu	Asn	Leu	Ile	Arg	Val	Phe	Gln	Glu	Gly	Lys	
	625					630					635					640	

	Asp	Ile	His	Thr	Gln	Thr	Ala	Ser	Trp	Met	Phe	Gly	Val	Pro	Pro	Glu	
					645					650					655		
5	Ala	Val	Asp	Pro	Leu	Met	Arg	Arg	Ala	Ala	Lys	Thr	Val	Asn	Phe	Gly	
				660					665					670			
	Val	Leu	Tyr	Gly	Met	Ser	Ala	His	Arg	Leu	Ser	Gln	Glu	Leu	Ala	Ile	
			675					680					685				
10	Pro	Tyr	Glu	Glu	Ala	Val	Ala	Phe	Ile	Glu	Arg	Tyr	Phe	Gln	Ser	Phe	
		690					695					700					
	Pro	Lys	Val	Arg	Ala	Trp	Ile	Glu	Lys	Thr	Leu	Glu	Glu	Gly	Arg	Lys	
15		705				710					715					720	
	Arg	Gly	Tyr	Val	Glu	Thr	Leu	Phe	Gly	Arg	Arg	Arg	Tyr	Val	Pro	Asp	
					725					730					735		
20	Leu	Asn	Ala	Arg	Val	Lys	Ser	Val	Arg	Glu	Ala	Ala	Glu	Arg	Met	Ala	
				740					745					750			
	Phe	Asn	Met	Pro	Val	Gln	Gly	Thr	Ala	Ala	Asp	Leu	Met	Lys	Leu	Ala	
			755					760					765				
25	Met	Val	Lys	Leu	Phe	Pro	Arg	Leu	Arg	Glu	Met	Gly	Ala	Arg	Met	Leu	
		770					775					780					
	Leu	Gln	Val	His	Asn	Glu	Leu	Leu	Leu	Glu	Ala	Pro	Gln	Ala	Arg	Ala	
30		785				790					795					800	
	Glu	Glu	Val	Ala	Ala	Leu	Ala	Lys	Glu	Ala	Met	Glu	Lys	Ala	Tyr	Pro	
					805					810					815		
35	Leu	Ala	Val	Pro	Leu	Glu	Val	Glu	Val	Gly	Met	Gly	Glu	Asp	Trp	Leu	
				820					825					830			
	Ser	Ala	Lys	Gly													
			835														
40	<210>	12															
	<211>	2511															
45	<212>	DNA															
	<213>	Thermus thermophilus															
	<400>	12															
50	atgaattccg	aggcgatgct	tccgctcttt	gaacccaaag	gccgggtcct	cctggtggac										60	
	ggccaccacc	tggcctaccg	caccttcttc	gcctgaagg	gcctcaccac	gagccggggc										120	
55	gaaccggtgc	aggcggtcta	cggcttcgcc	aagagcctcc	tcaaggccct	gaaggaggac										180	
	gggtacaagg	ccgtcttcgt	ggtctttgac	gccaaaggcc	cctccttcgc	ccacgaggcc										240	
	tacgaggcct	acaaggcggg	gagggccccg	acccccgagg	acttcccccg	gcagctcgcc										300	
60	ctcatcaagg	agctggtgga	cctcctgggg	tttaccgcgc	tcgaggtccc	cggctacgag										360	

	gcgagacgacg	ttctcgccac	cctggccaag	aaggcgga	aggaggggta	cgaggtgcgc	420
	atcctcaccg	ccgaccgga	cctctaccaa	ctcgtctccg	accgctcgc	cgtcctccac	480
5	cccgagggcc	acctcatcac	cccggagtgg	ctttgggaga	agtacggcct	caggccggag	540
	cagtgggtgg	acttcgcgc	cctcgtgggg	gacccctccg	acaacctccc	cggggtcaag	600
10	ggcatcgggg	agaagaccgc	cctcaagctc	ctcaaggagt	ggggaagcct	ggaaaacctc	660
	ctcaagaacc	tggaccgggt	aaagccagaa	aacgtccggg	agaagatcaa	ggcccacctg	720
	gaagacctca	ggctctcctt	ggagctctcc	cgggtgcgca	ccgacctccc	cctggaggtg	780
15	gacctcggcc	aggggcggga	gcccgaccgg	gaggggctta	gggccttcct	ggagaggctg	840
	gagttcggca	gcctcctcca	cgagttcggc	ctcctggagg	ccccgcccc	cctggaggag	900
20	gccccctggc	ccccgcggga	aggggccttc	gtgggcttcg	tcctctcccg	ccccgagccc	960
	atgtgggagg	agcttaaagc	cctggccggc	tgaggggacg	gcccgggtgca	ccgggcagca	1020
	gaccccttgg	cggggctaaa	ggacctcaag	gaggtccggg	gcctcctcgc	caaggacctc	1080
25	gccgtcttgg	cctcgaggga	ggggctagac	ctcgtgcccc	gggacgaccc	catgctcctc	1140
	gcctacctcc	tggacccctc	caacaccacc	cccagggggg	tggcgcgggc	ctacgggggg	1200
30	gagtggacgg	aggacggcg	ccaccggggc	ctcctctcgg	agaggctcca	tcggaacctc	1260
	cttaagcgcc	tcgaggggga	ggagaagctc	ctttggctct	accacgaggt	ggaaaagccc	1320
	ctctcccggg	tcctggccca	catggaggcc	accgggggtac	ggcgggacgt	ggcctacctt	1380
35	caggcccttt	ccctggagct	tgaggaggag	atccgcccgc	tcgaggagga	ggtcttccgc	1440
	ttggcgggcc	accccttcaa	cctcaactcc	cgggaccagc	tggaaagggg	gctctttgac	1500
40	gagcttaggc	ttcccgcctt	ggggaagacg	caaaagacag	gcaagcgctc	caccagcgcc	1560
	gcggtgctgg	aggccctacg	ggaggcccac	cccatcgtgg	agaagatcct	ccagcaccgg	1620
	gagctacca	agctcaagaa	cacctacgtg	gacccctccc	caagcctcgt	ccaccgagg	1680
45	acgggcccgc	tccacaccgc	cttcaaccag	acggccacgg	ccacggggag	gcttagtagc	1740
	tccgacccca	acctgcagaa	catccccgtc	cgcacccctt	tgggccagag	gatccgccgg	1800
50	gccttcgtgg	ccgaggcggg	ttgggcgttg	gtggccctgg	actatagcca	gatagagctc	1860
	cgcgtcctcg	cccacctctc	cggggacgaa	aacctgatca	gggtcttcca	ggaggggaag	1920
	gacatccaca	cccagaccgc	aagctggatg	ttcggcgctc	ccccggaggc	cgtggacccc	1980
55	ctgatgcgcc	gggcggccaa	gacgggtgaac	ttcggcgctc	tctacggcat	gtccgcccac	2040
	aggctctccc	aggagcttgc	catcccctac	gaggaggcgg	tggcctttat	agagcgctac	2100
	ttccaaagct	tccccaaggt	gcgggcctgg	atagaaaaga	ccctggagga	ggggaggaag	2160
60	cggggctacg	tggaaaccct	cttcggaaga	aggcgctacg	tgcccacact	caacgcccgg	2220

gtgaagagcg tcagggagggc cgcggagcgc atggccttca acatgcccgt ccagggcacc 2280  
 gccgcccacc tcatgaagct cgccatggtg aagctcttcc cccgcctccg ggagatgggg 2340  
 5 gccgcatgc tcctccaggt ccacaacgag ctctccttgaggagggggcc 2400  
 gaggaggtgg cggctttggc caaggaggcc atggagaagg cctatcccct cgccgtgccc 2460  
 ctggaggtgg aggtggggat gggggaggac tggctttccg ccaagggtta g 2511  
 10  
 <210> 13  
 <211> 58  
 15 <212> DNA  
 <213> synthetic  
 20 <400> 13  
 tgcctgcagg tcgacgctag ctagtgggtg tgggtgggtg gacccttggc ggaaagcc 58  
 25  
 <210> 14  
 <211> 2526  
 <212> DNA  
 30 <213> *Thermus thermophilus*  
 <400> 14  
 35 atgaattccg aggcgatgct tccgctcttt gaacccaaag gccgggtcct cctggtggac 60  
 ggccaccacc tggcctaccg caccttcttc gccctgaagg gcctcaccac gagccggggc 120  
 gaaccggtgc aggcggtcta cggcttcgcc aagagcctcc tcaaggccct gaaggaggac 180  
 40 ggggtacaagg ccgtcttcgt ggtctttgac gccaaggccc cctccttccg ccacgaggcc 240  
 tacgaggcct acaaggcggg gagggccccg acccccgagg acttcccccg gcagctcgcc 300  
 ctcatcaagg agctggtgga cctcctgggg tttaccgcc tcgaggtccc cggctacgag 360  
 gcggacgacg ttctcgccac cctggccaag aaggcggaag aggaggggta cgaggtgcgc 420  
 atcctcaccg ccgaccgga cctctaccaa ctctctccg accgcgtcgc cgtcctccac 480  
 50 cccgagggcc acctcatcac cccggagtgg ctttgggaga agtacggcct caggccggag 540  
 cagtgggtgg acttccgcgc cctcgtgggg gaccctccg acaacctccc cggggtcaag 600  
 55 ggcacggggg agaagaccgc cctcaagctc ctcaaggagt ggggaagcct ggaaaacctc 660  
 ctcaagaacc tggaccgggt aaagccagaa aacgtccggg agaagatcaa ggcccacctg 720  
 gaagacctca ggctctcctt ggagctctcc cgggtgcgca ccgacctccc cctggaggtg 780  
 60 gacctcgccc aggggcggga gcccgaccgg gaggggctta gggccttccct ggagaggctg 840

	gagttcggca gcctectcca cgagttcggc ctcttgagg ccccgcccc cctggaggag	900
	gccccctggc ccccgccgga aggggccttc gtgggcttcg tcctctcccg ccccgagccc	960
5	atgtgggagg agcttaaagc cctggccgcc tgcaggagcg gccgggtgca ccgggcagca	1020
	gaccccttgg cggggctaaa ggacctcaag gaggtccggg gcctcctcgc caaggacctc	1080
10	gccgtcttgg cctcgagggg ggggctagac ctctgcccc gggacgaccc catgctcctc	1140
	gcctacctcc tggacctctc caacaccacc cccgaggggg tggcgcgggc ctacgggggg	1200
	gagtggacgg aggacgccgc ccaccggggc ctctctcctg agaggtcca tcggaacctc	1260
15	cttaagcgcc tcgaggggga ggagaagctc ctttggctct accacgaggt ggaaaagccc	1320
	ctctccccgg tcctggccca catggaggcc accggggtag ggcgggacgt ggcctacctt	1380
20	caggcccttt cctggagct tgcggaggag atccgccgcc tcgaggagga ggtcttccgc	1440
	ttggcgggcc accccttcaa cctcaactcc cgggaccagc tggaaagggg gctctttgac	1500
	gagcttaggc ttcccgctt ggggaagacg caaaagacag gcaagcgctc caccagcgcc	1560
25	gcggtgctgg aggccttacg ggaggccac cccatcgtag agaagatcct ccagcaccgg	1620
	gagctacca agctcaagaa cacctacgtg gacccctcc caagcctcgt ccacccgagg	1680
30	acgggccgcc tccacaccgc cttcaaccag acggccacgg ccacggggag gcttagtagc	1740
	tccgaccca acctgcagaa catccccgtc cgcacccctt tgggacagag gatccgccgg	1800
	gccttcgtgg ccgaggcggg ttgggcgttg gtggccctgg actatagcca gatagagctc	1860
35	cgcgctctcg cccacctctc cggggacgaa aacctgatca gggctctcca ggaggggaag	1920
	gacatccaca cccagaccgc aagctggatg ttggcgctcc ccccgaggc cgtggacccc	1980
40	ctgatgcgcc gggcgccaa gacggtgaac ttggcgctcc tctacggcat gtccgcccac	2040
	aggctctccc aggagcttgc catcccctac gaggaggcgg tggcctttat agagcgctac	2100
	ttccaaagct tccccagggt gggggcctgg atagaaaaga ccctggagga ggggaggaag	2160
45	cggggctacg tggaaaccct cttcggaaga aggcgctacg tgcccacact caacgcccgg	2220
	gtgaagagcg tcaggaggc cgcggagcgc atggccttca acatgcccgt ccagggcacc	2280
50	gccgccgacc tcatgaagct cgccatggtg aagctcttcc cccgcctccg ggagatgggg	2340
	gcccgcacgc tcctccaggt ccacaacgag ctctcctcctg agggccccca agcgcgggcc	2400
	gaggaggtgg cggctttggc caaggaggcc atggagaagg cctatcccct cgccgtgccc	2460
55	ctggaggtgg aggtggggat gggggaggac tggctttccg ccaaggggtca ccaccaccac	2520
	caccac	2526
60	<210> 15	
	<211> 842	

<212> PRT

<213> Thermus thermophilus

5 <400> 15

	Met	Asn	Ser	Glu	Ala	Met	Leu	Pro	Leu	Phe	Glu	Pro	Lys	Gly	Arg	Val	
	1				5					10					15		
10	Leu	Leu	Val	Asp	Gly	His	His	Leu	Ala	Tyr	Arg	Thr	Phe	Phe	Ala	Leu	
				20					25					30			
	Lys	Gly	Leu	Thr	Thr	Ser	Arg	Gly	Glu	Pro	Val	Gln	Ala	Val	Tyr	Gly	
			35					40					45				
15	Phe	Ala	Lys	Ser	Leu	Leu	Lys	Ala	Leu	Lys	Glu	Asp	Gly	Tyr	Lys	Ala	
		50					55					60					
20	Val	Phe	Val	Val	Phe	Asp	Ala	Lys	Ala	Pro	Ser	Phe	Arg	His	Glu	Ala	
	65					70					75					80	
	Tyr	Glu	Ala	Tyr	Lys	Ala	Gly	Arg	Ala	Pro	Thr	Pro	Glu	Asp	Phe	Pro	
					85					90					95		
25	Arg	Gln	Leu	Ala	Leu	Ile	Lys	Glu	Leu	Val	Asp	Leu	Leu	Gly	Phe	Thr	
				100					105					110			
	Arg	Leu	Glu	Val	Pro	Gly	Tyr	Glu	Ala	Asp	Asp	Val	Leu	Ala	Thr	Leu	
			115					120					125				
30	Ala	Lys	Lys	Ala	Glu	Lys	Glu	Gly	Tyr	Glu	Val	Arg	Ile	Leu	Thr	Ala	
		130					135					140					
	Asp	Arg	Asp	Leu	Tyr	Gln	Leu	Val	Ser	Asp	Arg	Val	Ala	Val	Leu	His	
35	145					150				155						160	
	Pro	Glu	Gly	His	Leu	Ile	Thr	Pro	Glu	Trp	Leu	Trp	Glu	Lys	Tyr	Gly	
					165					170					175		
40	Leu	Arg	Pro	Glu	Gln	Trp	Val	Asp	Phe	Arg	Ala	Leu	Val	Gly	Asp	Pro	
				180					185					190			
	Ser	Asp	Asn	Leu	Pro	Gly	Val	Lys	Gly	Ile	Gly	Glu	Lys	Thr	Ala	Leu	
			195					200					205				
45	Lys	Leu	Leu	Lys	Glu	Trp	Gly	Ser	Leu	Glu	Asn	Leu	Leu	Lys	Asn	Leu	
		210					215					220					
	Asp	Arg	Val	Lys	Pro	Glu	Asn	Val	Arg	Glu	Lys	Ile	Lys	Ala	His	Leu	
50	225					230					235					240	
	Glu	Asp	Leu	Arg	Leu	Ser	Leu	Glu	Leu	Ser	Arg	Val	Arg	Thr	Asp	Leu	
					245					250					255		
55	Pro	Leu	Glu	Val	Asp	Leu	Ala	Gln	Gly	Arg	Glu	Pro	Asp	Arg	Glu	Gly	
				260					265					270			
	Leu	Arg	Ala	Phe	Leu	Glu	Arg	Leu	Glu	Phe	Gly	Ser	Leu	Leu	His	Glu	
			275					280					285				
60	Phe	Gly	Leu	Leu	Glu	Ala	Pro	Ala	Pro	Leu	Glu	Glu	Ala	Pro	Trp	Pro	
		290					295					300					

	Pro	Pro	Glu	Gly	Ala	Phe	Val	Gly	Phe	Val	Leu	Ser	Arg	Pro	Glu	Pro	
	305					310					315					320	
5	Met	Trp	Ala	Glu	Leu	Lys	Ala	Leu	Ala	Ala	Cys	Arg	Asp	Gly	Arg	Val	
					325					330					335		
	His	Arg	Ala	Ala	Asp	Pro	Leu	Ala	Gly	Leu	Lys	Asp	Leu	Lys	Glu	Val	
				340					345					350			
10	Arg	Gly	Leu	Leu	Ala	Lys	Asp	Leu	Ala	Val	Leu	Ala	Ser	Arg	Glu	Gly	
			355					360					365				
	Leu	Asp	Leu	Val	Pro	Gly	Asp	Asp	Pro	Met	Leu	Leu	Ala	Tyr	Leu	Leu	
		370					375					380					
15	Asp	Pro	Ser	Asn	Thr	Thr	Pro	Glu	Gly	Val	Ala	Arg	Arg	Tyr	Gly	Gly	
	385					390					395					400	
	Glu	Trp	Thr	Glu	Asp	Ala	Ala	His	Arg	Ala	Leu	Leu	Ser	Glu	Arg	Leu	
					405					410					415		
20	His	Arg	Asn	Leu	Leu	Lys	Arg	Leu	Glu	Gly	Glu	Glu	Lys	Leu	Leu	Trp	
				420					425					430			
25	Leu	Tyr	His	Glu	Val	Glu	Lys	Pro	Leu	Ser	Arg	Val	Leu	Ala	His	Met	
			435					440					445				
	Glu	Ala	Thr	Gly	Val	Arg	Arg	Asp	Val	Ala	Tyr	Leu	Gln	Ala	Leu	Ser	
		450					455					460					
30	Leu	Glu	Leu	Ala	Glu	Glu	Ile	Arg	Arg	Leu	Glu	Glu	Glu	Val	Phe	Arg	
		465				470					475					480	
	Leu	Ala	Gly	His	Pro	Phe	Asn	Leu	Asn	Ser	Arg	Asp	Gln	Leu	Glu	Arg	
					485					490					495		
35	Val	Leu	Phe	Asp	Glu	Leu	Arg	Leu	Pro	Ala	Leu	Gly	Lys	Thr	Gln	Lys	
				500					505					510			
40	Thr	Gly	Lys	Arg	Ser	Thr	Ser	Ala	Ala	Val	Leu	Glu	Ala	Leu	Arg	Glu	
			515					520					525				
	Ala	His	Pro	Ile	Val	Glu	Lys	Ile	Leu	Gln	His	Arg	Glu	Leu	Thr	Lys	
		530					535					540					
45	Leu	Lys	Asn	Thr	Tyr	Val	Asp	Pro	Leu	Pro	Ser	Leu	Val	His	Pro	Arg	
		545				550					555					560	
	Thr	Gly	Arg	Leu	His	Thr	Arg	Phe	Asn	Gln	Thr	Ala	Thr	Ala	Thr	Gly	
					565					570					575		
50	Arg	Leu	Ser	Ser	Ser	Asp	Pro	Asn	Leu	Gln	Asn	Ile	Pro	Val	Arg	Thr	
				580					585					590			
55	Pro	Leu	Gly	Gln	Arg	Ile	Arg	Arg	Ala	Phe	Val	Ala	Glu	Ala	Gly	Trp	
			595					600					605				
	Ala	Leu	Val	Ala	Leu	Asp	Tyr	Ser	Gln	Ile	Glu	Leu	Arg	Val	Leu	Ala	
		610					615					620					
60	His	Leu	Ser	Gly	Asp	Glu	Asn	Leu	Ile	Arg	Val	Phe	Gln	Glu	Gly	Lys	
						625					630					640	

	Asp	Ile	His	Thr	Gln	Thr	Ala	Ser	Trp	Met	Phe	Gly	Val	Pro	Pro	Glu
					645					650					655	
5	Ala	Val	Asp	Pro	Leu	Met	Arg	Arg	Ala	Ala	Lys	Thr	Val	Asn	Phe	Gly
				660					665					670		
	Val	Leu	Tyr	Gly	Met	Ser	Ala	His	Arg	Leu	Ser	Gln	Glu	Leu	Ala	Ile
			675					680					685			
10	Pro	Tyr	Glu	Glu	Ala	Val	Ala	Phe	Ile	Glu	Arg	Tyr	Phe	Gln	Ser	Phe
		690					695					700				
	Pro	Lys	Val	Arg	Ala	Trp	Ile	Glu	Lys	Thr	Leu	Glu	Glu	Gly	Arg	Lys
15		705				710					715					720
	Arg	Gly	Tyr	Val	Glu	Thr	Leu	Phe	Gly	Arg	Arg	Arg	Tyr	Val	Pro	Asp
					725					730					735	
20	Leu	Asn	Ala	Arg	Val	Lys	Ser	Val	Arg	Glu	Ala	Ala	Glu	Arg	Met	Ala
				740					745					750		
	Phe	Asn	Met	Pro	Val	Gln	Gly	Thr	Ala	Ala	Asp	Leu	Met	Lys	Leu	Ala
			755					760					765			
25	Met	Val	Lys	Leu	Phe	Pro	Arg	Leu	Arg	Glu	Met	Gly	Ala	Arg	Met	Leu
		770					775					780				
	Leu	Gln	Val	His	Asn	Glu	Leu	Leu	Leu	Glu	Ala	Pro	Gln	Ala	Arg	Ala
		785				790					795					800
30	Glu	Glu	Val	Ala	Ala	Leu	Ala	Lys	Glu	Ala	Met	Glu	Lys	Ala	Tyr	Pro
					805					810					815	
	Leu	Ala	Val	Pro	Leu	Glu	Val	Glu	Val	Gly	Met	Gly	Glu	Asp	Trp	Leu
35				820					825					830		
	Ser	Ala	Lys	Gly	His	His	His	His	His	His	His	His	His	His	His	His
			835						840							
40	<210>	16														
	<211>	31														
45	<212>	DNA														
	<213>	synthetic														
	<400>	16														
50	gcctgcaggg	gcggccgcgt	gcaccggggc	a												
																31
	<210>	17														
55	<211>	26														
	<212>	DNA														
	<213>	synthetic														
60	<400>	17														



	ctcctggacc cttcgaacac cacc	26
5	<210> 18	
	<211> 23	
	<212> DNA	
10	<213> synthetic	
	<400> 18	
15	gtcctggccc atatggaggc cac	23
	<210> 19	
20	<211> 2526	
	<212> DNA	
	<213> Thermus thermophilus	
25	<400> 19	
	atgaattccg aggcgatgct tccgctcttt gaacccaaag gccgggtcct cctggtggac	60
	ggccaccacc tggcctaccg caccttcttc gccctgaagg gcctcaccac gagccggggc	120
30	gaaccggtgc aggcggtcta cggcttcgcc aagagcctcc tcaaggccct gaaggaggac	180
	gggtacaagg ccgtcttcgt ggtctttgac gccaaaggccc cctccttcctg ccacgaggcc	240
35	tacgaggcct acaaggcggg gagggccccg acccccagag acttcccccg gcagctcgcc	300
	ctcatcaagg agctggtgga cctcctgggg tttaccgcgc tcgaggtccc cggctacgag	360
40	gcggacgacg ttctcgccac cctggccaag aaggcggaag aggaggggta cgaggtgcgc	420
	atcctcaccg ccgaccgcga cctctaccaa ctctctccg accgcgtcgc cgtcctccac	480
	cccaggggcc acctcatcac cccggagtgg ctttgggaga agtacggcct caggccggag	540
45	cagtgggtgg acttccgcgc cctcgtgggg gaccctccg acaacctccc cggggtcaag	600
	ggcatcgggg agaagaccgc cctcaagctc ctcaaggagt ggggaagcct ggaaaacctc	660
50	ctcaagaacc tggaccgggt aaagccagaa aacgtccggg agaagatcaa ggcccacctg	720
	gaagacctca ggctctcctt ggagctctcc cgggtgcgca ccgacctccc cctggagggtg	780
	gacctcgccc aggggcggga gcccgaccgg gaggggctta gggccttcct ggagaggctg	840
55	gagttcggea gcctcctcca cgagttcggc ctcttgagg ccccgcccc cctggaggag	900
	gccccctggc ccccgccgga aggggccttc gtgggcttcg tcctctccc ccccgagccc	960
60	atgtgggagg agcttaaagc cctggccgcc tgcaggggag gccgcgtgca ccgggcagca	1020
	gacccttggt cggggctaaa ggacctcaag gaggtccggg gcctcctcgc caaggacctc	1080

gccgtcttgg cctcgaggga ggggctagac ctctgtcccc gggacgaccc catgctcctc 1140  
 gcctacctcc tggacccttc gaacaccacc cccgaggggg tggcgcgggc ctacgggggg 1200  
 5 gagtggacgg aggacgccgc ccaccggggc ctctctctcg agaggctcca tcggaacctc 1260  
 cttaagcgcc tcgaggggga ggagaagctc ctttggctct accacgaggt ggaaaagccc 1320  
 10 ctctccccgg tcttggccca tatggaggcc accgggggtac ggcgggacgt ggcctacctt 1380  
 caggcccttt ccctggagct tgcggaggag atccgccgcc tcgaggagga ggtcttccgc 1440  
 ttggcgggcc acccttcaa cctcaactcc cgggaccagc tggaaagggg gctctttgac 1500  
 15 gagcttaggc ttccgcctt ggggaagacg caaaagacag gcaagcgctc caccagcgcc 1560  
 gcggtgctgg aggccctacg ggaggccac cccatcgtag agaagatcct ccagcaccgg 1620  
 gagctacca agctcaagaa cacctacgtg gacccctcc caagcctcgt ccacccgagg 1680  
 20 acgggcccgc tccacaccgc cttcaaccag acggccacgg ccacggggag gcttagtagc 1740  
 tccgaccca acctgcagaa catccccgtc cgcacccct tgggccagag gatccgccgg 1800  
 25 gccttcgtgg ccgaggcggg ttgggcgttg gtggccctgg actatagcca gatagagctc 1860  
 cgcgtcctcg cccacctctc cggggacgaa aacctgatca gggctctcca ggagggaag 1920  
 gacatccaca cccagaccgc aagctggatg ttcggcgctc ccccgaggc cgtggacccc 1980  
 30 ctgatgcgcc gggcgccaa gacggtgaac ttcggcgctc tctacggcat gtccgcccac 2040  
 aggctctccc aggagcttgc catcccctac gaggaggcgg tggcctttat agagcgctac 2100  
 35 ttccaaagct tccccaggt gcgggcctgg atagaaaaga ccctggagga ggggaggaag 2160  
 cggggctacg tggaaacctt cttcggaaga aggcgctacg tgcccacact caacgcccgg 2220  
 gtgaagagcg tcaggaggc cgcggagcgc atggccttca acatgcccgt ccagggcacc 2280  
 40 gccgccgacc tcatgaagct cgccatggtg aagctcttcc cccgcctccg ggagatgggg 2340  
 gcccgcatgc tctccaggt ccacaacgag ctctctctgg agggccccc aagcgggggc 2400  
 45 gaggaggtgg cggctttggc caaggaggcc atggagaagg cctatcccct cgccgtgccc 2460  
 ctggaggtgg aggtggggat gggggaggac tggctttccg ccaagggtca ccaccaccac 2520  
 caccac 2526

50 <210> 20

<211> 842

55 <212> PRT

<213> *Thermus thermophilus*

60 <400> 20

Met Asn Ser Glu Ala Met Leu Pro Leu Phe Glu Pro Lys Gly Arg Val

	1		5		10		15									
	Leu	Leu	Val	Asp 20	Gly	His	His	Leu	Ala 25	Tyr	Arg	Thr	Phe	Phe 30	Ala	Leu
5	Lys	Gly	Leu 35	Thr	Thr	Ser	Arg	Gly 40	Glu	Pro	Val	Gln	Ala 45	Val	Tyr	Gly
10	Phe	Ala 50	Lys	Ser	Leu	Leu	Lys 55	Ala	Leu	Lys	Glu	Asp 60	Gly	Tyr	Lys	Ala
	Val 65	Phe	Val	Val	Phe	Asp 70	Ala	Lys	Ala	Pro	Ser 75	Phe	Arg	His	Glu	Ala 80
15	Tyr	Glu	Ala	Tyr	Lys 85	Ala	Gly	Arg	Ala	Pro 90	Thr	Pro	Glu	Asp 95	Phe	Pro
	Arg	Gln	Leu	Ala 100	Leu	Ile	Lys	Glu	Leu 105	Val	Asp	Leu	Leu	Gly 110	Phe	Thr
20	Arg	Leu	Glu 115	Val	Pro	Gly	Tyr	Glu 120	Ala	Asp	Asp	Val	Leu 125	Ala	Thr	Leu
	Ala	Lys 130	Lys	Ala	Glu	Lys	Glu 135	Gly	Tyr	Glu	Val	Arg 140	Ile	Leu	Thr	Ala
25	Asp 145	Arg	Asp	Leu	Tyr	Gln 150	Leu	Val	Ser	Asp 155	Arg	Val	Ala	Val	Leu	His 160
30	Pro	Glu	Gly	His	Leu 165	Ile	Thr	Pro	Glu	Trp 170	Leu	Trp	Glu	Lys	Tyr 175	Gly
	Leu	Arg	Pro	Glu 180	Gln	Trp	Val	Asp	Phe 185	Arg	Ala	Leu	Val	Gly 190	Asp	Pro
35	Ser	Asp	Asn 195	Leu	Pro	Gly	Val	Lys 200	Gly	Ile	Gly	Glu	Lys 205	Thr	Ala	Leu
	Lys	Leu 210	Leu	Lys	Glu	Trp	Gly 215	Ser	Leu	Glu	Asn 220	Leu	Leu	Lys	Asn	Leu
40	Asp 225	Arg	Val	Lys	Pro	Glu 230	Asn	Val	Arg	Glu	Lys 235	Ile	Lys	Ala	His	Leu 240
45	Glu	Asp	Leu	Arg	Leu 245	Ser	Leu	Glu	Leu	Ser 250	Arg	Val	Arg	Thr	Asp 255	Leu
	Pro	Leu	Glu	Val 260	Asp	Leu	Ala	Gln	Gly 265	Arg	Glu	Pro	Asp	Arg 270	Glu	Gly
50	Leu	Arg	Ala 275	Phe	Leu	Glu	Arg	Leu 280	Glu	Phe	Gly	Ser	Leu 285	Leu	His	Glu
	Phe	Gly 290	Leu	Leu	Glu	Ala	Pro 295	Ala	Pro	Leu	Glu	Glu 300	Ala	Pro	Trp	Pro
55	Pro 305	Pro	Glu	Gly	Ala	Phe 310	Val	Gly	Phe	Val	Leu 315	Ser	Arg	Pro	Glu	Pro 320
60	Met	Trp	Ala	Glu	Leu 325	Lys	Ala	Leu	Ala	Ala 330	Cys	Arg	Gly	Gly	Arg 335	Val

	His	Arg	Ala	Ala	Asp	Pro	Leu	Ala	Gly	Leu	Lys	Asp	Leu	Lys	Glu	Val	
				340					345					350			
5	Arg	Gly	Leu	Leu	Ala	Lys	Asp	Leu	Ala	Val	Leu	Ala	Ser	Arg	Glu	Gly	
			355					360					365				
	Leu	Asp	Leu	Val	Pro	Gly	Asp	Asp	Pro	Met	Leu	Leu	Ala	Tyr	Leu	Leu	
		370					375					380					
10	Asp	Pro	Ser	Asn	Thr	Thr	Pro	Glu	Gly	Val	Ala	Arg	Arg	Tyr	Gly	Gly	
	385					390					395					400	
	Glu	Trp	Thr	Glu	Asp	Ala	Ala	His	Arg	Ala	Leu	Leu	Ser	Glu	Arg	Leu	
					405					410					415		
15	His	Arg	Asn	Leu	Leu	Lys	Arg	Leu	Glu	Gly	Glu	Glu	Lys	Leu	Leu	Trp	
				420					425					430			
20	Leu	Tyr	His	Glu	Val	Glu	Lys	Pro	Leu	Ser	Arg	Val	Leu	Ala	His	Met	
			435					440					445				
	Glu	Ala	Thr	Gly	Val	Arg	Arg	Asp	Val	Ala	Tyr	Leu	Gln	Ala	Leu	Ser	
		450					455					460					
25	Leu	Glu	Leu	Ala	Glu	Glu	Ile	Arg	Arg	Leu	Glu	Glu	Glu	Val	Phe	Arg	
	465					470					475					480	
	Leu	Ala	Gly	His	Pro	Phe	Asn	Leu	Asn	Ser	Arg	Asp	Gln	Leu	Glu	Arg	
					485				490						495		
30	Val	Leu	Phe	Asp	Glu	Leu	Arg	Leu	Pro	Ala	Leu	Gly	Lys	Thr	Gln	Lys	
				500					505					510			
35	Thr	Gly	Lys	Arg	Ser	Thr	Ser	Ala	Ala	Val	Leu	Glu	Ala	Leu	Arg	Glu	
			515					520					525				
	Ala	His	Pro	Ile	Val	Glu	Lys	Ile	Leu	Gln	His	Arg	Glu	Leu	Thr	Lys	
		530					535					540					
40	Leu	Lys	Asn	Thr	Tyr	Val	Asp	Pro	Leu	Pro	Ser	Leu	Val	His	Pro	Arg	
	545					550					555					560	
	Thr	Gly	Arg	Leu	His	Thr	Arg	Phe	Asn	Gln	Thr	Ala	Thr	Ala	Thr	Gly	
					565					570						575	
45	Arg	Leu	Ser	Ser	Ser	Asp	Pro	Asn	Leu	Gln	Asn	Ile	Pro	Val	Arg	Thr	
				580					585					590			
50	Pro	Leu	Gly	Gln	Arg	Ile	Arg	Arg	Ala	Phe	Val	Ala	Glu	Ala	Gly	Trp	
			595					600					605				
	Ala	Leu	Val	Ala	Leu	Asp	Tyr	Ser	Gln	Ile	Glu	Leu	Arg	Val	Leu	Ala	
		610					615					620					
55	His	Leu	Ser	Gly	Asp	Glu	Asn	Leu	Ile	Arg	Val	Phe	Gln	Glu	Gly	Lys	
	625					630					635					640	
	Asp	Ile	His	Thr	Gln	Thr	Ala	Ser	Trp	Met	Phe	Gly	Val	Pro	Pro	Glu	
					645					650					655		
60	Ala	Val	Asp	Pro	Leu	Met	Arg	Arg	Ala	Ala	Lys	Thr	Val	Asn	Phe	Gly	
				660					665					670			

	Val Leu Tyr Gly Met Ser Ala His Arg Leu Ser Gln Glu Leu Ala Ile	
	675 680 685	
5	Pro Tyr Glu Glu Ala Val Ala Phe Ile Glu Arg Tyr Phe Gln Ser Phe	
	690 695 700	
	Pro Lys Val Arg Ala Trp Ile Glu Lys Thr Leu Glu Glu Gly Arg Lys	
	705 710 715 720	
10	Arg Gly Tyr Val Glu Thr Leu Phe Gly Arg Arg Arg Tyr Val Pro Asp	
	725 730 735	
	Leu Asn Ala Arg Val Lys Ser Val Arg Glu Ala Ala Glu Arg Met Ala	
	740 745 750	
15	Phe Asn Met Pro Val Gln Gly Thr Ala Ala Asp Leu Met Lys Leu Ala	
	755 760 765	
20	Met Val Lys Leu Phe Pro Arg Leu Arg Glu Met Gly Ala Arg Met Leu	
	770 775 780	
	Leu Gln Val His Asn Glu Leu Leu Leu Glu Ala Pro Gln Ala Arg Ala	
	785 790 795 800	
25	Glu Glu Val Ala Ala Leu Ala Lys Glu Ala Met Glu Lys Ala Tyr Pro	
	805 810 815	
	Leu Ala Val Pro Leu Glu Val Glu Val Gly Met Gly Glu Asp Trp Leu	
	820 825 830	
30	Ser Ala Lys Gly His His His His His His	
	835 840	
35	<210> 21	
	<211> 30	
	<212> DNA	
40	<213> synthetic	
	<400> 21	
45	caggaggagc tcgttggcga cctggaggag	30
	<210> 22	
50	<211> 2526	
	<212> DNA	
	<213> Thermus thermophilus	
55	<400> 22	
	atgaattccg aggcgatgct tccgctcttt gaacccaaag gccgggtcct cctggtggac	60
60	ggccaccacc tggcctaccg caccttcttc gccctgaagg gcctcaccac gagccggggc	120
	gaaccggtgc aggcggtcta cggcttcgcc aagagcctcc tcaaggccct gaaggaggac	180

	gggtacaagg	ccgtcttcgt	ggtctttgac	gccaaaggccc	cctccttccg	ccacgaggcc	240
	tacgaggcct	acaaggcggg	gagggccccc	acccccgagg	acttcccccg	gcagctcgcc	300
5	ctcatcaagg	agctggtgga	cctcctgggg	tttaccgcgc	tcgaggtccc	cggctacgag	360
	gcggaacgac	ttctcgccac	cctggccaag	aaggcggaaa	aggaggggta	cgaggtgcgc	420
10	atcctcaccg	ccgaccgcga	cctctaccaa	ctcgtctccg	accgcgtcgc	cgctcctccac	480
	cccgaaggcc	acctcatcac	cccggagtgg	ctttgggaga	agtacggcct	caggccggag	540
	cagtgggtgg	acttccgcgc	cctcgtgggg	gacccctccg	acaacctccc	cggggtcaag	600
15	ggcatcgggg	agaagaccgc	cctcaagctc	ctcaaggagt	ggggaagcct	ggaaaacctc	660
	ctcaagaacc	tggaccgggt	aaagccagaa	aacgtccggg	agaagatcaa	ggcccacctg	720
20	gaagacctca	ggctctcctt	ggagctctcc	cgggtgcgca	ccgacctccc	cctggaggtg	780
	gacctcgccc	aggggcggga	gcccgaaccg	gaggggctta	gggccttcct	ggagaggctg	840
	gagttcggca	gcctcctcca	cgagttcggc	ctcctggagg	ccccgcgcc	cctggaggag	900
25	gccccctggc	ccccgcggga	aggggccttc	gtgggcttcg	tcctctcccg	ccccgagccc	960
	atgtgggcgg	agcttaaagc	cctggccgcc	tgcagggggc	gccgcgtgca	ccgggcagca	1020
30	gaccccttgg	cggggctaaa	ggacctcaag	gaggtccggg	gcctcctcgc	caaggacctc	1080
	gccgtcttgg	cctcgagggg	ggggctagac	ctcgtgcccc	gggacgacct	catgctcctc	1140
	gcctacctcc	tggacccttc	gaacaccacc	cccgaagggg	tggcgcggcg	ctacgggggg	1200
35	gagtggacgg	aggacgccgc	ccaccggggc	ctcctctcgg	agaggtcca	tcggaacctc	1260
	cttaagcgcc	tcgaggggga	ggagaagctc	ctttggctct	accacgaggt	ggaaaagccc	1320
40	ctctccccgg	tcctggccca	tatggaggcc	accgggggtac	ggcgggacgt	ggcctacctt	1380
	caggcccttt	ccctggagct	tgcggaggag	atccgccgcc	tcgaggagga	ggtcttccgc	1440
	ttggcggggc	accccttcaa	cctcaactcc	cgggaccagc	tggaaagggg	gctctttgac	1500
45	gagcttaggc	ttcccgcctt	ggggaagacg	caaaagacag	gcaagcgctc	caccagcgcc	1560
	gcggtgctgg	aggccctacg	ggaggcccac	cccatcgtgg	agaagatcct	ccagcaccgg	1620
50	gagctcacca	agctcaagaa	cacctacgtg	gacccccctc	caagcctcgt	ccacccgagg	1680
	acgggcccgc	tccacaccgc	cttcaaccag	acggccacgg	ccacggggag	gcttagtagc	1740
	tccgacccca	acctgcagaa	catccccgtc	cgcacccccct	tgggccagag	gatccgccgg	1800
55	gccttcgtgg	ccgaggcggg	ttgggcgttg	gtggccctgg	actatagcca	gatagagctc	1860
	cgcgtcctcg	cccacctctc	cggggacgaa	aacctgatca	gggtcttcca	ggaggggaag	1920
60	gacatccaca	cccagaccgc	aagctggatg	ttcggcgctc	ccccggaggc	cgtggacccc	1980
	ctgatgcgcc	gggcggccaa	gacggtgaac	ttcggcgctc	tctacggcat	gtccgcccac	2040

5 aggcctctccc aggagcttgc catcccctac gaggaggcgg tggcctttat agagcgctac 2100  
 ttccaaagct tcccgaaggt gcgggcctgg atagaaaaga ccctggagga ggggaggaag 2160  
 10 cggggctacg tggaaaccct cttcggaaga aggcgctacg tgcccgcact caacgcccgg 2220  
 gtgaagagcg tcaggaggcg cgcgagcgc atggccttca acatgcccgt ccagggcacc 2280  
 gccgcccacc tcatgaagct cgccatggtg aagctcttcc cccgcctccg ggagatgggg 2340  
 15 gcccgcacgc tcctccaggt cgccaacgag ctctcctcgg aggccccca agcgcggggc 2400  
 gaggaggtgg cggctttggc caaggaggcc atggagaagg cctatcccct cgccgtgccc 2460  
 20 ctggaggtgg aggtggggat gggggaggac tggctttccg ccaagggtca ccaccaccac 2520  
 caccac 2526

20 <210> 23

<211> 842

<212> PRT

25 <213> *Thermus thermophilus*

<400> 23

30 Met Asn Ser Glu Ala Met Leu Pro Leu Phe Glu Pro Lys Gly Arg Val  
     1                    5                    10                    15  
 Leu Leu Val Asp Gly His His Leu Ala Tyr Arg Thr Phe Phe Ala Leu  
                     20                    25                    30  
 35 Lys Gly Leu Thr Thr Ser Arg Gly Glu Pro Val Gln Ala Val Tyr Gly  
                     35                    40                    45  
 40 Phe Ala Lys Ser Leu Leu Lys Ala Leu Lys Glu Asp Gly Tyr Lys Ala  
                     50                    55                    60  
 Val Phe Val Val Phe Asp Ala Lys Ala Pro Ser Phe Arg His Glu Ala  
                     65                    70                    75                    80  
 45 Tyr Glu Ala Tyr Lys Ala Gly Arg Ala Pro Thr Pro Glu Asp Phe Pro  
                     85                    90                    95  
 Arg Gln Leu Ala Leu Ile Lys Glu Leu Val Asp Leu Leu Gly Phe Thr  
                     100                    105                    110  
 50 Arg Leu Glu Val Pro Gly Tyr Glu Ala Asp Asp Val Leu Ala Thr Leu  
                     115                    120                    125  
 55 Ala Lys Lys Ala Glu Lys Glu Gly Tyr Glu Val Arg Ile Leu Thr Ala  
                     130                    135                    140  
 Asp Arg Asp Leu Tyr Gln Leu Val Ser Asp Arg Val Ala Val Leu His  
                     145                    150                    155                    160  
 60 Pro Glu Gly His Leu Ile Thr Pro Glu Trp Leu Trp Glu Lys Tyr Gly  
                     165                    170                    175

	Leu	Arg	Pro	Glu	Gln	Trp	Val	Asp	Phe	Arg	Ala	Leu	Val	Gly	Asp	Pro	
				180					185					190			
5	Ser	Asp	Asn	Leu	Pro	Gly	Val	Lys	Gly	Ile	Gly	Glu	Lys	Thr	Ala	Leu	
			195					200					205				
	Lys	Leu	Leu	Lys	Glu	Trp	Gly	Ser	Leu	Glu	Asn	Leu	Leu	Lys	Asn	Leu	
		210					215					220					
10	Asp	Arg	Val	Lys	Pro	Glu	Asn	Val	Arg	Glu	Lys	Ile	Lys	Ala	His	Leu	
						230					235					240	
	Glu	Asp	Leu	Arg	Leu	Ser	Leu	Glu	Leu	Ser	Arg	Val	Arg	Thr	Asp	Leu	
					245					250					255		
15	Pro	Leu	Glu	Val	Asp	Leu	Ala	Gln	Gly	Arg	Glu	Pro	Asp	Arg	Glu	Gly	
				260					265					270			
20	Leu	Arg	Ala	Phe	Leu	Glu	Arg	Leu	Glu	Phe	Gly	Ser	Leu	Leu	His	Glu	
			275					280					285				
	Phe	Gly	Leu	Leu	Glu	Ala	Pro	Ala	Pro	Leu	Glu	Glu	Ala	Pro	Trp	Pro	
		290					295					300					
25	Pro	Pro	Glu	Gly	Ala	Phe	Val	Gly	Phe	Val	Leu	Ser	Arg	Pro	Glu	Pro	
						310					315					320	
	Met	Trp	Ala	Glu	Leu	Lys	Ala	Leu	Ala	Ala	Cys	Arg	Gly	Gly	Arg	Val	
					325					330					335		
30	His	Arg	Ala	Ala	Asp	Pro	Leu	Ala	Gly	Leu	Lys	Asp	Leu	Lys	Glu	Val	
				340					345					350			
	Arg	Gly	Leu	Leu	Ala	Lys	Asp	Leu	Ala	Val	Leu	Ala	Ser	Arg	Glu	Gly	
			355					360					365				
35	Leu	Asp	Leu	Val	Pro	Gly	Asp	Asp	Pro	Met	Leu	Leu	Ala	Tyr	Leu	Leu	
		370					375					380					
40	Asp	Pro	Ser	Asn	Thr	Thr	Pro	Glu	Gly	Val	Ala	Arg	Arg	Tyr	Gly	Gly	
						390					395					400	
	Glu	Trp	Thr	Glu	Asp	Ala	Ala	His	Arg	Ala	Leu	Leu	Ser	Glu	Arg	Leu	
					405					410					415		
45	His	Arg	Asn	Leu	Leu	Lys	Arg	Leu	Glu	Gly	Glu	Glu	Lys	Leu	Leu	Trp	
				420					425					430			
50	Leu	Tyr	His	Glu	Val	Glu	Lys	Pro	Leu	Ser	Arg	Val	Leu	Ala	His	Met	
			435					440					445				
	Glu	Ala	Thr	Gly	Val	Arg	Arg	Asp	Val	Ala	Tyr	Leu	Gln	Ala	Leu	Ser	
			450				455					460					
55	Leu	Glu	Leu	Ala	Glu	Glu	Ile	Arg	Arg	Leu	Glu	Glu	Glu	Val	Phe	Arg	
						470					475					480	
	Leu	Ala	Gly	His	Pro	Phe	Asn	Leu	Asn	Ser	Arg	Asp	Gln	Leu	Glu	Arg	
					485					490					495		
60	Val	Leu	Phe	Asp	Glu	Leu	Arg	Leu	Pro	Ala	Leu	Gly	Lys	Thr	Gln	Lys	
				500					505					510			



	Thr	Gly	Lys	Arg	Ser	Thr	Ser	Ala	Ala	Val	Leu	Glu	Ala	Leu	Arg	Glu	
			515					520					525				
5	Ala	His	Pro	Ile	Val	Glu	Lys	Ile	Leu	Gln	His	Arg	Glu	Leu	Thr	Lys	
			530				535					540					
	Leu	Lys	Asn	Thr	Tyr	Val	Asp	Pro	Leu	Pro	Ser	Leu	Val	His	Pro	Arg	
			545			550					555					560	
10	Thr	Gly	Arg	Leu	His	Thr	Arg	Phe	Asn	Gln	Thr	Ala	Thr	Ala	Thr	Gly	
					565					570						575	
	Arg	Leu	Ser	Ser	Ser	Asp	Pro	Asn	Leu	Gln	Asn	Ile	Pro	Val	Arg	Thr	
15				580					585					590			
	Pro	Leu	Gly	Gln	Arg	Ile	Arg	Arg	Ala	Phe	Val	Ala	Glu	Ala	Gly	Trp	
			595					600					605				
20	Ala	Leu	Val	Ala	Leu	Asp	Tyr	Ser	Gln	Ile	Glu	Leu	Arg	Val	Leu	Ala	
			610				615					620					
	His	Leu	Ser	Gly	Asp	Glu	Asn	Leu	Ile	Arg	Val	Phe	Gln	Glu	Gly	Lys	
						630					635					640	
25	Asp	Ile	His	Thr	Gln	Thr	Ala	Ser	Trp	Met	Phe	Gly	Val	Pro	Pro	Glu	
					645					650					655		
	Ala	Val	Asp	Pro	Leu	Met	Arg	Arg	Ala	Ala	Lys	Thr	Val	Asn	Phe	Gly	
				660					665					670			
30	Val	Leu	Tyr	Gly	Met	Ser	Ala	His	Arg	Leu	Ser	Gln	Glu	Leu	Ala	Ile	
			675					680					685				
	Pro	Tyr	Glu	Glu	Ala	Val	Ala	Phe	Ile	Glu	Arg	Tyr	Phe	Gln	Ser	Phe	
35			690				695					700					
	Pro	Lys	Val	Arg	Ala	Trp	Ile	Glu	Lys	Thr	Leu	Glu	Glu	Gly	Arg	Lys	
						710					715					720	
40	Arg	Gly	Tyr	Val	Glu	Thr	Leu	Phe	Gly	Arg	Arg	Arg	Tyr	Val	Pro	Asp	
					725				730						735		
	Leu	Asn	Ala	Arg	Val	Lys	Ser	Val	Arg	Glu	Ala	Ala	Glu	Arg	Met	Ala	
				740					745					750			
45	Phe	Asn	Met	Pro	Val	Gln	Gly	Thr	Ala	Ala	Asp	Leu	Met	Lys	Leu	Ala	
			755					760					765				
50	Met	Val	Lys	Leu	Phe	Pro	Arg	Leu	Arg	Glu	Met	Gly	Ala	Arg	Met	Leu	
			770				775					780					
	Leu	Gln	Val	Ala	Asn	Glu	Leu	Leu	Leu	Glu	Ala	Pro	Gln	Ala	Arg	Ala	
						790					795					800	
55	Glu	Glu	Val	Ala	Ala	Leu	Ala	Lys	Glu	Ala	Met	Glu	Lys	Ala	Tyr	Pro	
					805					810					815		
	Leu	Ala	Val	Pro	Leu	Glu	Val	Glu	Val	Gly	Met	Gly	Glu	Asp	Trp	Leu	
				820					825					830			
60	Ser	Ala	Lys	Gly	His	His	His	His	His	His							
			835					840									

<210> 24  
 <211> 30  
 5 <212> DNA  
 <213> synthetic  
 10 <400> 24  
 caggaggagc tcgttggcga cctggaggag 30  
 <210> 25  
 <211> 2526  
 <212> DNA  
 20 <213> *Thermus thermophilus*  
 <400> 25  
 25 atgaattccg aggcgatgct tccgctcttt gaacccaaag gccgggtcct cctggtggac 60  
 ggccaccacc tggcctaccg caccttcttc gccctgaagg gcctcaccac gagccggggc 120  
 gaaccggtgc aggcggtcta cggcttcgcc aagagcctcc tcaaggccct gaaggaggac 180  
 30 ggggtacaagg ccgtcttcgt ggtctttgac gccaaaggccc cctccttcctg ccacgaggcc 240  
 tacgaggcct acaaggcggg gagggccccg acccccagagg acttcccccg gcagctcgcc 300  
 35 ctcatcaagg agctggtgga cctcctggggg tttaccgcgc tcgaggtccc cggctacgag 360  
 gcggaacgacg ttctcgccac cctggccaag aaggcggaag aggaggggta cgaggtgcgc 420  
 atcctcaccg ccgaccgcga cctctaccaa ctcgctctccg accgcgtcgc cgtcctccac 480  
 40 cccgagggcc acctcatcac cccggagtgg ctttgggaga agtacggcct caggccggag 540  
 cagtgggtgg acttccgcgc cctcgtggggg gaccctcctg acaacctccc cggggtcaag 600  
 45 ggcatcgggg agaagaccgc cctcaagctc ctcaaggagt ggggaagcct ggaaaacctc 660  
 ctcaagaacc tggaccgggt aaagccagaa aacgtccggg agaagatcaa ggcccacctg 720  
 gaagacctca ggctctcctt ggagctctcc cgggtgcgca ccgacctccc cctggagggtg 780  
 50 gacctcgccc aggggcggga gcccgaccgg gaggggctta gggccttcct ggagaggctg 840  
 gagttcggca gcctcctcca cgagttcggc ctcttgagg ccccgcccc cctggaggag 900  
 55 gccccctggc ccccgccgga aggggccttc gtgggcttcg tcctctcccg ccccgagccc 960  
 atgtgggagg agcttaaagc cctggccgcc tgcaggggag gccgcgtgca ccgggcagca 1020  
 gacccttggt cggggctaaa ggacctcaag gaggtccggg gcctcctcgc caaggacctc 1080  
 60 gccgtcttgg cctcgaggga ggggctagac ctcggtcccc gggacgacct catgctcctc 1140

	gcctacctcc	tggaaccttc	gaacaccacc	cccgaggggg	tggcgcgggc	ctacgggggg	1200
	gagtggacgg	aggacgccgc	ccaccggggc	ctcctctcgg	agaggctcca	tcggaacctc	1260
5	cttaagcgcc	tcgaggggga	ggagaagctc	ctttggctct	accacgaggt	ggaaaagccc	1320
	ctctccccgg	tcctggccca	tatggaggcc	accgggggtac	ggcgggacgt	ggcctacctt	1380
10	caggcccttt	ccctggagct	tgcgaggagg	atccgccgcc	tcgaggagga	ggtcttccgc	1440
	ttggcgggcc	accccttcaa	cctcaactcc	cgggaccagc	tggaaagggg	gctctttgac	1500
	gagcttaggc	ttcccgcttc	gaagaagacg	aagaagacag	gcaagcgctc	caccagcgcc	1560
15	gcggtgctgg	aggccctacg	ggaggcccac	cccatcgtag	agaagatcct	ccagcaccgg	1620
	gagctcacca	agctcaagaa	cacctacgtg	gacccccctc	caagcctcgt	ccacccgagg	1680
20	acggggccgc	tccacaccgc	cttcaaccag	acggccacgg	ccacggggag	gcttagtagc	1740
	tccgacccca	acctgcagaa	catccccgtc	cgcacccccct	tgggcccagag	gatccgcccg	1800
	gccttcgtgg	ccgaggcggg	ttggggcggt	gtggccctgg	actatagcca	gatagagctc	1860
25	cgcgctctcg	cccacctctc	cggggacgaa	aacctgatca	gggtcttcca	ggaggggaag	1920
	gacatccaca	cccagaccgc	aagctggatg	ttcggcgctc	ccccggaggc	cgtggacccc	1980
30	ctgatgcgcc	gggcggccaa	gacggtgaac	ttcggcgctc	tctacggcat	gtccgcccac	2040
	aggctctccc	aggagcttgc	catcccctac	gaggaggcgg	tggcctttat	agagcgctac	2100
	ttccaaagct	tccccaaggt	gcgggcctgg	atagaaaaga	ccctggagga	ggggaggaag	2160
35	cggggctacg	tggaaacctt	cttcggaaga	aggcgctacg	tgcccgcact	caacgcccgg	2220
	gtgaagagcg	tcagggaggc	cgcggagcgc	atggccttca	acatgcccg	ccagggcacc	2280
40	gccgccgacc	tcataagct	cgccatggtg	aagctcttcc	cccgcctccg	ggagatgggg	2340
	gcccgcacgc	tcctccaggt	cgccaacgag	ctcctcctgg	aggcccccca	agcgcgggcc	2400
	gaggaggtgg	cggctttggc	caaggaggcc	atggagaagg	cctatcccct	cgcctgccc	2460
45	ctggaggtgg	aggtggggat	gggggaggac	tggctttccg	ccaagggtca	ccaccaccac	2520
	caccac						2526
50	<210>	26					
	<211>	842					
	<212>	PRT					
55	<213>	Thermus thermophilus					
	<400>	26					
60	Met Asn Ser Glu Ala Met Leu Pro Leu Phe Glu Pro Lys Gly Arg Val						
	1 5 10 15						

	Leu	Leu	Val	Asp	Gly	His	His	Leu	Ala	Tyr	Arg	Thr	Phe	Phe	Ala	Leu	
				20					25					30			
5	Lys	Gly	Leu	Thr	Thr	Ser	Arg	Gly	Glu	Pro	Val	Gln	Ala	Val	Tyr	Gly	
			35					40					45				
	Phe	Ala	Lys	Ser	Leu	Leu	Lys	Ala	Leu	Lys	Glu	Asp	Gly	Tyr	Lys	Ala	
		50					55					60					
10	Val	Phe	Val	Val	Phe	Asp	Ala	Lys	Ala	Pro	Ser	Phe	Arg	His	Glu	Ala	
		65				70					75					80	
	Tyr	Glu	Ala	Tyr	Lys	Ala	Gly	Arg	Ala	Pro	Thr	Pro	Glu	Asp	Phe	Pro	
					85					90					95		
15	Arg	Gln	Leu	Ala	Leu	Ile	Lys	Glu	Leu	Val	Asp	Leu	Leu	Gly	Phe	Thr	
				100					105					110			
	Arg	Leu	Glu	Val	Pro	Gly	Tyr	Glu	Ala	Asp	Asp	Val	Leu	Ala	Thr	Leu	
20			115					120					125				
	Ala	Lys	Lys	Ala	Glu	Lys	Glu	Gly	Tyr	Glu	Val	Arg	Ile	Leu	Thr	Ala	
		130					135					140					
25	Asp	Arg	Asp	Leu	Tyr	Gln	Leu	Val	Ser	Asp	Arg	Val	Ala	Val	Leu	His	
		145				150					155					160	
	Pro	Glu	Gly	His	Leu	Ile	Thr	Pro	Glu	Trp	Leu	Trp	Glu	Lys	Tyr	Gly	
					165					170					175		
30	Leu	Arg	Pro	Glu	Gln	Trp	Val	Asp	Phe	Arg	Ala	Leu	Val	Gly	Asp	Pro	
				180					185					190			
	Ser	Asp	Asn	Leu	Pro	Gly	Val	Lys	Gly	Ile	Gly	Glu	Lys	Thr	Ala	Leu	
35			195					200					205				
	Lys	Leu	Leu	Lys	Glu	Trp	Gly	Ser	Leu	Glu	Asn	Leu	Leu	Lys	Asn	Leu	
		210					215					220					
40	Asp	Arg	Val	Lys	Pro	Glu	Asn	Val	Arg	Glu	Lys	Ile	Lys	Ala	His	Leu	
		225				230					235					240	
	Glu	Asp	Leu	Arg	Leu	Ser	Leu	Glu	Leu	Ser	Arg	Val	Arg	Thr	Asp	Leu	
					245					250					255		
45	Pro	Leu	Glu	Val	Asp	Leu	Ala	Gln	Gly	Arg	Glu	Pro	Asp	Arg	Glu	Gly	
				260					265					270			
	Leu	Arg	Ala	Phe	Leu	Glu	Arg	Leu	Glu	Phe	Gly	Ser	Leu	Leu	His	Glu	
50			275					280					285				
	Phe	Gly	Leu	Leu	Glu	Ala	Pro	Ala	Pro	Leu	Glu	Glu	Ala	Pro	Trp	Pro	
		290					295					300					
55	Pro	Pro	Glu	Gly	Ala	Phe	Val	Gly	Phe	Val	Leu	Ser	Arg	Pro	Glu	Pro	
		305				310					315					320	
	Met	Trp	Ala	Glu	Leu	Lys	Ala	Leu	Ala	Ala	Cys	Arg	Gly	Gly	Arg	Val	
					325					330					335		
60	His	Arg	Ala	Ala	Asp	Pro	Leu	Ala	Gly	Leu	Lys	Asp	Leu	Lys	Glu	Val	
				340					345					350			

	Arg	Gly	Leu	Leu	Ala	Lys	Asp	Leu	Ala	Val	Leu	Ala	Ser	Arg	Glu	Gly	
			355					360					365				
5	Leu	Asp	Leu	Val	Pro	Gly	Asp	Asp	Pro	Met	Leu	Leu	Ala	Tyr	Leu	Leu	
		370					375					380					
	Asp	Pro	Ser	Asn	Thr	Thr	Pro	Glu	Gly	Val	Ala	Arg	Arg	Tyr	Gly	Gly	
	385					390					395				400		
10	Glu	Trp	Thr	Glu	Asp	Ala	Ala	His	Arg	Ala	Leu	Leu	Ser	Glu	Arg	Leu	
					405					410					415		
	His	Arg	Asn	Leu	Leu	Lys	Arg	Leu	Glu	Gly	Glu	Glu	Lys	Leu	Leu	Trp	
			420						425					430			
15	Leu	Tyr	His	Glu	Val	Glu	Lys	Pro	Leu	Ser	Arg	Val	Leu	Ala	His	Met	
		435						440					445				
20	Glu	Ala	Thr	Gly	Val	Arg	Arg	Asp	Val	Ala	Tyr	Leu	Gln	Ala	Leu	Ser	
	450						455					460					
	Leu	Glu	Leu	Ala	Glu	Glu	Ile	Arg	Arg	Leu	Glu	Glu	Glu	Val	Phe	Arg	
	465					470					475				480		
25	Leu	Ala	Gly	His	Pro	Phe	Asn	Leu	Asn	Ser	Arg	Asp	Gln	Leu	Glu	Arg	
					485					490					495		
	Val	Leu	Phe	Asp	Glu	Leu	Arg	Leu	Pro	Ala	Leu	Lys	Lys	Thr	Lys	Lys	
			500						505					510			
30	Thr	Gly	Lys	Arg	Ser	Thr	Ser	Ala	Ala	Val	Leu	Glu	Ala	Leu	Arg	Glu	
		515						520					525				
	Ala	His	Pro	Ile	Val	Glu	Lys	Ile	Leu	Gln	His	Arg	Glu	Leu	Thr	Lys	
	530						535					540					
35	Leu	Lys	Asn	Thr	Tyr	Val	Asp	Pro	Leu	Pro	Ser	Leu	Val	His	Pro	Arg	
	545					550					555					560	
40	Thr	Gly	Arg	Leu	His	Thr	Arg	Phe	Asn	Gln	Thr	Ala	Thr	Ala	Thr	Gly	
					565					570					575		
	Arg	Leu	Ser	Ser	Ser	Asp	Pro	Asn	Leu	Gln	Asn	Ile	Pro	Val	Arg	Thr	
			580						585					590			
45	Pro	Leu	Gly	Gln	Arg	Ile	Arg	Arg	Ala	Phe	Val	Ala	Glu	Ala	Gly	Trp	
		595						600					605				
50	Ala	Leu	Val	Ala	Leu	Asp	Tyr	Ser	Gln	Ile	Glu	Leu	Arg	Val	Leu	Ala	
	610						615					620					
	His	Leu	Ser	Gly	Asp	Glu	Asn	Leu	Ile	Arg	Val	Phe	Gln	Glu	Gly	Lys	
	625					630					635				640		
55	Asp	Ile	His	Thr	Gln	Thr	Ala	Ser	Trp	Met	Phe	Gly	Val	Pro	Pro	Glu	
					645					650					655		
	Ala	Val	Asp	Pro	Leu	Met	Arg	Arg	Ala	Ala	Lys	Thr	Val	Asn	Phe	Gly	
			660						665					670			
60	Val	Leu	Tyr	Gly	Met	Ser	Ala	His	Arg	Leu	Ser	Gln	Glu	Leu	Ala	Ile	
		675						680					685				

	Pro	Tyr	Glu	Glu	Ala	Val	Ala	Phe	Ile	Glu	Arg	Tyr	Phe	Gln	Ser	Phe	
	690						695					700					
5	Pro	Lys	Val	Arg	Ala	Trp	Ile	Glu	Lys	Thr	Leu	Glu	Glu	Gly	Arg	Lys	
	705					710					715					720	
	Arg	Gly	Tyr	Val	Glu	Thr	Leu	Phe	Gly	Arg	Arg	Arg	Tyr	Val	Pro	Asp	
					725					730					735		
10	Leu	Asn	Ala	Arg	Val	Lys	Ser	Val	Arg	Glu	Ala	Ala	Glu	Arg	Met	Ala	
					740				745					750			
	Phe	Asn	Met	Pro	Val	Gln	Gly	Thr	Ala	Ala	Asp	Leu	Met	Lys	Leu	Ala	
15			755					760					765				
	Met	Val	Lys	Leu	Phe	Pro	Arg	Leu	Arg	Glu	Met	Gly	Ala	Arg	Met	Leu	
		770					775					780					
20	Leu	Gln	Val	Ala	Asn	Glu	Leu	Leu	Leu	Glu	Ala	Pro	Gln	Ala	Arg	Ala	
		785				790					795					800	
	Glu	Glu	Val	Ala	Ala	Leu	Ala	Lys	Glu	Ala	Met	Glu	Lys	Ala	Tyr	Pro	
					805					810					815		
25	Leu	Ala	Val	Pro	Leu	Glu	Val	Glu	Val	Gly	Met	Gly	Glu	Asp	Trp	Leu	
				820					825					830			
	Ser	Ala	Lys	Gly	His	His	His	His	His	His	His	His	His	His	His	His	
30			835						840								
	<210>																27
	<211>																340
35	<212>																PRT
	<213>																Pyrococcus furiosus
40	<400>																27
	Met	Gly	Val	Pro	Ile	Gly	Glu	Ile	Ile	Pro	Arg	Lys	Glu	Ile	Glu	Leu	
	1					5				10					15		
45	Glu	Asn	Leu	Tyr	Gly	Lys	Lys	Ile	Ala	Ile	Asp	Ala	Leu	Asn	Ala	Ile	
				20					25					30			
	Tyr	Gln	Phe	Leu	Ser	Thr	Ile	Arg	Gln	Lys	Asp	Gly	Thr	Pro	Leu	Met	
			35					40					45				
50	Asp	Ser	Lys	Gly	Arg	Ile	Thr	Ser	His	Leu	Ser	Gly	Leu	Phe	Tyr	Arg	
		50					55					60					
	Thr	Ile	Asn	Leu	Met	Glu	Ala	Gly	Ile	Lys	Pro	Val	Tyr	Val	Phe	Asp	
55		65				70					75					80	
	Gly	Glu	Pro	Pro	Glu	Phe	Lys	Lys	Lys	Glu	Leu	Glu	Lys	Arg	Arg	Glu	
					85					90					95		
60	Ala	Arg	Glu	Glu	Ala	Glu	Glu	Lys	Trp	Arg	Glu	Ala	Leu	Glu	Lys	Gly	
				100					105					110			

Glu Ile Glu Glu Ala Arg Lys Tyr Ala Gln Arg Ala Thr Arg Val Asn  
 115 120 125  
 5 Glu Met Leu Ile Glu Asp Ala Lys Lys Leu Leu Glu Leu Met Gly Ile  
 130 135 140  
 Pro Ile Val Gln Ala Pro Ser Glu Gly Glu Ala Gln Ala Ala Tyr Met  
 145 150 155 160  
 10 Ala Ala Lys Gly Ser Val Tyr Ala Ser Ala Ser Gln Asp Tyr Asp Ser  
 165 170 175  
 Leu Leu Phe Gly Ala Pro Arg Leu Val Arg Asn Leu Thr Ile Thr Gly  
 180 185 190  
 15 Lys Arg Lys Leu Pro Gly Lys Asn Val Tyr Val Glu Ile Lys Pro Glu  
 195 200 205  
 20 Leu Ile Ile Leu Glu Glu Val Leu Lys Glu Leu Lys Leu Thr Arg Glu  
 210 215 220  
 Lys Leu Ile Glu Leu Ala Ile Leu Val Gly Thr Asp Tyr Asn Pro Gly  
 225 230 235 240  
 25 Gly Ile Lys Gly Ile Gly Leu Lys Lys Ala Leu Glu Ile Val Arg His  
 245 250 255  
 Ser Lys Asp Pro Leu Ala Lys Phe Gln Lys Gln Ser Asp Val Asp Leu  
 260 265 270  
 30 Tyr Ala Ile Lys Glu Phe Phe Leu Asn Pro Pro Val Thr Asp Asn Tyr  
 275 280 285  
 Asn Leu Val Trp Arg Asp Pro Asp Glu Glu Gly Ile Leu Lys Phe Leu  
 290 295 300  
 35 Cys Asp Glu His Asp Phe Ser Glu Glu Arg Val Lys Asn Gly Leu Glu  
 305 310 315 320  
 40 Arg Leu Lys Lys Ala Ile Lys Ser Gly Lys Gln Ser Thr Leu Glu Ser  
 325 330 335  
 Trp Phe Lys Arg  
 340  
 45 <210> 28  
 <211> 326  
 <212> PRT  
 50 <213> Methanococcus jannaschii  
 <400> 28  
 55 Met Gly Val Gln Phe Gly Asp Phe Ile Pro Lys Asn Ile Ile Ser Phe  
 1 5 10 15  
 Glu Asp Leu Lys Gly Lys Lys Val Ala Ile Asp Gly Met Asn Ala Leu  
 20 25 30  
 60 Tyr Gln Phe Leu Thr Ser Ile Arg Leu Arg Asp Gly Ser Pro Leu Arg  
 35 40 45

	Asn	Arg	Lys	Gly	Glu	Ile	Thr	Ser	Ala	Tyr	Asn	Gly	Val	Phe	Tyr	Lys	
	50						55				60						
5	Thr	Ile	His	Leu	Leu	Glu	Asn	Asp	Ile	Thr	Pro	Ile	Trp	Val	Phe	Asp	80
	65					70				75							
	Gly	Glu	Pro	Pro	Lys	Leu	Lys	Glu	Lys	Thr	Arg	Lys	Val	Arg	Arg	Glu	95
					85					90							
10	Met	Lys	Glu	Lys	Ala	Glu	Leu	Lys	Met	Lys	Glu	Ala	Ile	Lys	Lys	Glu	
				100					105					110			
	Asp	Phe	Glu	Glu	Ala	Ala	Lys	Tyr	Ala	Lys	Arg	Val	Ser	Tyr	Leu	Thr	
15			115					120					125				
	Pro	Lys	Met	Val	Glu	Asn	Cys	Lys	Tyr	Leu	Leu	Ser	Leu	Met	Gly	Ile	
		130					135					140					
20	Pro	Tyr	Val	Glu	Ala	Pro	Ser	Glu	Gly	Glu	Ala	Gln	Ala	Ser	Tyr	Met	160
	145					150					155						
	Ala	Lys	Lys	Gly	Asp	Val	Trp	Ala	Val	Val	Ser	Gln	Asp	Tyr	Asp	Ala	175
					165					170							
25	Leu	Leu	Tyr	Gly	Ala	Pro	Arg	Val	Val	Arg	Asn	Leu	Thr	Thr	Thr	Lys	
				180					185					190			
	Glu	Met	Pro	Glu	Leu	Ile	Glu	Leu	Asn	Glu	Val	Leu	Glu	Asp	Leu	Arg	
			195					200					205				
30	Ile	Ser	Leu	Asp	Asp	Leu	Ile	Asp	Ile	Ala	Ile	Phe	Met	Gly	Thr	Asp	
		210					215					220					
	Tyr	Asn	Pro	Gly	Gly	Val	Lys	Gly	Ile	Gly	Phe	Lys	Arg	Ala	Tyr	Glu	240
35						230				235							
	Leu	Val	Arg	Ser	Gly	Val	Ala	Lys	Asp	Val	Leu	Lys	Lys	Glu	Val	Glu	255
					245					250							
40	Tyr	Tyr	Asp	Glu	Ile	Lys	Arg	Ile	Phe	Lys	Glu	Pro	Lys	Val	Thr	Asp	
				260					265					270			
	Asn	Tyr	Ser	Leu	Ser	Leu	Lys	Leu	Pro	Asp	Lys	Glu	Gly	Ile	Ile	Lys	
			275					280					285				
45	Phe	Leu	Val	Asp	Glu	Asn	Asp	Phe	Asn	Tyr	Asp	Arg	Val	Lys	Lys	His	
		290					295					300					
50	Val	Asp	Lys	Leu	Tyr	Asn	Leu	Ile	Ala	Asn	Lys	Thr	Lys	Gln	Lys	Thr	320
	305					310					315						
	Leu	Asp	Ala	Trp	Phe	Lys											
					325												
55																	
	<210> 29																
	<211> 328																
60	<212> PRT																
	<213> Methanobacterium thermoautotrophicum																



<400> 29

5	Met	Gly	Val	Lys	Leu	Arg	Asp	Val	Val	Ser	Pro	Arg	Arg	Ile	Arg	Leu
	1				5					10					15	
	Glu	Asp	Leu	Arg	Gly	Arg	Thr	Val	Ala	Val	Asp	Ala	Ala	Asn	Thr	Leu
				20					25					30		
10	Tyr	Gln	Phe	Leu	Ser	Ser	Ile	Arg	Gln	Arg	Asp	Gly	Thr	Pro	Leu	Met
			35					40					45			
	Asp	Ser	Arg	Gly	Arg	Val	Thr	Ser	His	Leu	Ser	Gly	Ile	Leu	Tyr	Arg
		50					55					60				
15	Thr	Ala	Ala	Val	Met	Glu	Arg	Glu	Ile	Arg	Val	Ile	Tyr	Val	Phe	Asp
	65					70					75					80
	Gly	Arg	Ser	His	His	Leu	Lys	Gly	Glu	Thr	Val	Ser	Arg	Arg	Ala	Asp
					85					90					95	
20	Ile	Arg	Lys	Lys	Ser	Glu	Val	Glu	Trp	Lys	Arg	Ala	Leu	Glu	Glu	Gly
			100						105					110		
	Asp	Ile	Asp	Arg	Ala	Arg	Lys	Tyr	Ala	Val	Arg	Ser	Ser	Arg	Met	Ser
25			115					120					125			
	Ser	Glu	Ile	Leu	Glu	Ser	Ser	Lys	Arg	Leu	Leu	Glu	Leu	Leu	Gly	Ile
		130					135					140				
30	Pro	Tyr	Val	Gln	Ala	Pro	Gly	Glu	Gly	Glu	Ala	Gln	Ala	Ser	Tyr	Met
	145					150					155					160
	Val	Lys	Met	Gly	Asp	Ala	Trp	Ala	Val	Ala	Ser	Gln	Asp	Tyr	Asp	Cys
					165					170					175	
35	Leu	Leu	Phe	Gly	Ala	Pro	Arg	Val	Val	Arg	Lys	Val	Thr	Leu	Ser	Gly
				180					185					190		
	Lys	Leu	Glu	Asp	Pro	His	Ile	Ile	Glu	Leu	Glu	Ser	Thr	Leu	Arg	Ala
40			195					200					205			
	Leu	Ser	Ile	Ser	His	Thr	Gln	Leu	Val	Asp	Met	Ala	Leu	Leu	Val	Gly
		210					215					220				
45	Thr	Asp	Phe	Asn	Glu	Gly	Val	Lys	Gly	Tyr	Gly	Ala	Arg	Arg	Gly	Leu
	225					230					235					240
	Lys	Leu	Ile	Arg	Glu	Lys	Gly	Asp	Ile	Phe	Lys	Val	Ile	Arg	Asp	Leu
					245					250					255	
50	Glu	Ala	Asp	Ile	Gly	Gly	Asp	Pro	Gln	Val	Leu	Arg	Arg	Ile	Phe	Leu
				260					265					270		
	Glu	Pro	Glu	Val	Ser	Glu	Asp	Tyr	Glu	Ile	Arg	Trp	Arg	Lys	Pro	Asp
55			275					280					285			
	Val	Glu	Gly	Val	Ile	Glu	Phe	Leu	Cys	Thr	Glu	His	Gly	Phe	Ser	Glu
		290					295					300				
60	Asp	Arg	Val	Arg	Asp	Ala	Leu	Lys	Lys	Phe	Glu	Gly	Ala	Ser	Ser	Thr
	305					310					315					320

Gln Lys Ser Leu Glu Asp Trp Phe  
325

5  
<210> 30  
<211> 336  
10 <212> PRT  
<213> Afu  
<400> 30  
15  
Met Gly Ala Asp Ile Gly Asp Leu Phe Glu Arg Glu Glu Val Glu Leu  
1 5 10 15  
20 Glu Tyr Phe Ser Gly Lys Lys Ile Ala Val Asp Ala Phe Asn Thr Leu  
20 25 30  
Tyr Gln Phe Ile Ser Ile Ile Arg Gln Pro Asp Gly Thr Pro Leu Lys  
35 40 45  
25 Asp Ser Gln Gly Arg Ile Thr Ser His Leu Ser Gly Ile Leu Tyr Arg  
50 55 60  
30 Val Ser Asn Met Val Glu Val Gly Ile Arg Pro Val Phe Val Phe Asp  
65 70 75 80  
Gly Glu Pro Pro Glu Phe Lys Lys Ala Glu Ile Glu Glu Arg Lys Lys  
85 90 95  
35 Arg Arg Ala Glu Ala Glu Glu Met Trp Ile Ala Ala Leu Gln Ala Gly  
100 105 110  
Asp Lys Asp Ala Lys Lys Tyr Ala Gln Ala Ala Gly Arg Val Asp Glu  
115 120 125  
40 Tyr Ile Val Asp Ser Ala Lys Thr Leu Leu Ser Tyr Met Gly Ile Pro  
130 135 140  
Phe Val Asp Ala Pro Ser Glu Gly Glu Ala Gln Ala Ala Tyr Met Ala  
145 150 155 160  
45 Ala Lys Gly Asp Val Glu Tyr Thr Gly Ser Gln Asp Tyr Asp Ser Leu  
165 170 175  
50 Leu Phe Gly Ser Pro Arg Leu Ala Arg Asn Leu Ala Ile Thr Gly Lys  
180 185 190  
Arg Lys Leu Pro Gly Lys Asn Val Tyr Val Asp Val Lys Pro Glu Ile  
195 200 205  
55 Ile Ile Leu Glu Ser Asn Leu Lys Arg Leu Gly Leu Thr Arg Glu Gln  
210 215 220  
Leu Ile Asp Ile Ala Ile Leu Val Gly Thr Asp Tyr Asn Glu Gly Val  
225 230 235 240  
60 Lys Gly Val Gly Val Lys Lys Ala Leu Asn Tyr Ile Lys Thr Tyr Gly

	245	250	255
5	Asp Ile Phe Arg 260	Ala Leu Lys Ala Leu Lys Val 265	Asn Ile Asp His Val 270
10	Glu Glu Ile Arg Asn Phe Phe 275	Leu Asn Pro Pro Val 280	Thr Asp Asp Tyr 285
15	Arg Ile Glu Phe Arg Glu Pro Asp Phe Glu Lys 290	Ala Ile Glu Phe Leu 300	
20	Cys Glu Glu His Asp Phe Ser Arg Glu Arg Val Glu Lys Ala Leu Glu 305	310	315 320
25	Lys Leu Lys Ala Leu Lys Ser Thr Gln Ala Thr Leu Glu Arg Trp Phe 325	330	335
30	<210> 31		
35	<211> 27		
40	<212> DNA		
45	<213> synthetic		
50	<220><221> misc_feature<222> (17)..(18)<223> n = degeneracy		
55	<220><221> misc_feature<222> (27)..(28)<223> n = degeneracy		
60	<400> 31		
	atctctagca ctgctgtntt ygayggg		
65	<210> 32		
70	<211> 31		
75	<212> DNA		
80	<213> synthetic		
85	<220><221> misc_feature<222> (21)..(22)<223> n = degeneracy		
90	<220><221> misc_feature<222> (27)..(28)<223> n = degeneracy		
95	<400> 32		
100	gatctctagc actgctgarg gngargcnca r		
105	<210> 33		
110	<211> 28		
115	<212> DNA		
120	<213> synthetic		
125	<400> 33		

	gatctctagc actgctcarg aytaygay	28
5	<210> 34 <211> 31 <212> DNA	
10	<213> synthetic <220><221> misc_feature<222> (19)..(20)<223> n = degeneracy <220><221> misc_feature<222> (25)..(26)<223> n = degeneracy	
15	<400> 34 cttaaggtag gactacytgn gcytcncct c	31
20	<210> 35 <211> 30	
25	<212> DNA <213> synthetic <400> 35	
30	ttaaggtagg actacytcrt aytcytgret	30
35	<210> 36 <211> 30 <212> DNA	
40	<213> synthetic <220><221> misc_feature<222> (27)..(28)<223> n = degeneracy <400> 36	
45	ttaaggtagg actacytcrt aytcytgnga	30
50	<210> 37 <211> 30 <212> DNA	
55	<213> synthetic <220><221> misc_feature<222> (24)..(25)<223> n = degeneracy <220><221> misc_feature<222> (27)..(28)<223> n = degeneracy	
60	<400> 37	

	ttaaggtagg actacrtrw artcngtncc	30
5	<210> 38	
	<211> 16	
	<212> DNA	
10	<213> synthetic	
	<400> 38	
15	gatctctagc actgct	16
	<210> 39	
20	<211> 17	
	<212> DNA	
	<213> synthetic	
25	<400> 39	
	ccttaaggta ggactac	17
30	<210> 40	
	<211> 27	
35	<212> DNA	
	<213> synthetic	
	<400> 40	
40	tatcgacgcg atccacttct cctctgc	27
	<210> 41	
45	<211> 27	
	<212> DNA	
	<213> synthetic	
50	<400> 41	
	cttaaacggc aacctgagaa ggcttgg	27
55	<210> 42	
	<211> 28	
60	<212> DNA	
	<213> synthetic	

	<400> 42	
	ctatctcctt ctgcttgaaa acaggagg	28
5	<210> 43	
	<211> 27	
10	<212> DNA	
	<213> synthetic	
	<400> 43	
15	acaagggaac agctcgtcga tatcgcg	27
	<210> 44	
20	<211> 32	
	<212> DNA	
25	<213> synthetic	
	<400> 44	
30	taacgaattc ggtgcagaca taggcgaact ac	32
	<210> 45	
	<211> 33	
35	<212> DNA	
	<213> synthetic	
40	<400> 45	
	cggtgtcgac tcaggaaaac cacctctcaa gcg	33
45	<210> 46	
	<211> 37	
	<212> DNA	
50	<213> synthetic	
	<400> 46	
55	cacaggaaac agaccatggg tgcagacata ggcgaac	37
	<210> 47	
60	<211> 1017	
	<212> DNA	

<213> Ave

<400> 47

5 atgggtgcag acataggcga actactcgag agagaagaag ttgaacttga gtactttctcc 60  
gggagaaaaa tagctattga tgcttttaac actcttttacc agttcatatc tatcataagg 120  
caacctgacg gcactccttt gaaggattct cagggtagaa tgacctcaca cctctccggc 180  
10 atcctgtacc gcgtgtcaaa catgatcgag gttggaatga gaccattttt cgttttcgat 240  
ggtagagcctc ctgtttttcaa gcagaaggag atagaggaac gaaaggaaag aagagctgaa 300  
15 gcagaggaga agtggatcgc tgcgatagag agaggagaga agtacgcaa gaagtacgct 360  
caggcagcgg cgagggttga tgaatacatc gtcgagtcgt caaagaagct gcttgagtat 420  
atgggagttc catgggttca ggcgccgagt gaggagagg cacaggctgc atacatggca 480  
20 gcgaagggcg atgtagattt tactggctcg caggattacg actcgcttct cttcggcagc 540  
ccaaagcttg caagaaatct cgcgattact ggaaagagga agctgcccgg aaagaatgtt 600  
25 tacgttgagg tcaaaccaga gataatagac ttaaaccggca acctgagaag gcttggaata 660  
acaagggaaac agctcgtcga tatcgcgttg ctctgtggaa cggactacaa cgaaggagtg 720  
aagggcggtt ggggtcaagaa ggcctacaag tacataaaaa cctacggaga tgttttcaaa 780  
30 gctctcaagg ccttaaagggt agagcaggag aacatagagg agataagaaa cttcttctctg 840  
aaccgcctg ttacgaacaa ctacagcctc cacttcggaa agccagacga tgagaagatt 900  
35 atcgagttcc tgtgtgaaga gcacgacttt agcaaggata gggtagagaa ggccgttgag 960  
aagctgaaag caggaatgca agcctcgcaa tcaacgcttg agagggtggtt ttctga 1017

<210> 48

<211> 337

<212> PRT

<213> Ave

<400> 48

50 Met Gly Ala Asp Ile Gly Glu Leu Leu Glu Arg Glu Glu Val Glu Leu  
1 5 10 15  
Glu Tyr Phe Ser Gly Arg Lys Ile Ala Ile Asp Ala Phe Asn Thr Leu  
20 25 30  
55 Tyr Gln Phe Ile Ser Ile Ile Arg Gln Pro Asp Gly Thr Pro Leu Lys  
35 40 45  
60 Asp Ser Gln Gly Arg Met Thr Ser His Leu Ser Gly Ile Leu Tyr Arg  
50 55 60  
Val Ser Asn Met Ile Glu Val Gly Met Arg Pro Ile Phe Val Phe Asp

	65		70		75		80									
	Gly	Glu	Pro	Pro	Val	Phe	Lys	Gln	Lys	Glu	Ile	Glu	Glu	Arg	Lys	Glu
					85					90					95	
5	Arg	Arg	Ala	Glu	Ala	Glu	Glu	Lys	Trp	Ile	Ala	Ala	Ile	Glu	Arg	Gly
				100					105					110		
10	Glu	Lys	Tyr	Ala	Lys	Lys	Tyr	Ala	Gln	Ala	Ala	Ala	Arg	Val	Asp	Glu
			115					120					125			
	Tyr	Ile	Val	Glu	Ser	Ser	Lys	Lys	Leu	Leu	Glu	Tyr	Met	Gly	Val	Pro
		130					135					140				
15	Trp	Val	Gln	Ala	Pro	Ser	Glu	Gly	Glu	Ala	Gln	Ala	Ala	Tyr	Met	Ala
	145					150					155					160
	Ala	Lys	Gly	Asp	Val	Asp	Phe	Thr	Gly	Ser	Gln	Asp	Tyr	Asp	Ser	Leu
					165					170					175	
20	Leu	Phe	Gly	Ser	Pro	Lys	Leu	Ala	Arg	Asn	Leu	Ala	Ile	Thr	Gly	Lys
				180					185					190		
	Arg	Lys	Leu	Pro	Gly	Lys	Asn	Val	Tyr	Val	Glu	Val	Lys	Pro	Glu	Ile
			195					200					205			
25	Ile	Asp	Leu	Asn	Gly	Asn	Leu	Arg	Arg	Leu	Gly	Ile	Thr	Arg	Glu	Gln
		210					215					220				
30	Leu	Val	Asp	Ile	Ala	Leu	Leu	Val	Gly	Thr	Asp	Tyr	Asn	Glu	Gly	Val
	225					230					235					240
	Lys	Gly	Val	Gly	Val	Lys	Lys	Ala	Tyr	Lys	Tyr	Ile	Lys	Thr	Tyr	Gly
					245					250					255	
35	Asp	Val	Phe	Lys	Ala	Leu	Lys	Ala	Leu	Lys	Val	Glu	Gln	Glu	Asn	Ile
				260					265					270		
40	Glu	Glu	Ile	Arg	Asn	Phe	Phe	Leu	Asn	Pro	Pro	Val	Thr	Asn	Asn	Tyr
			275					280					285			
	Ser	Leu	His	Phe	Gly	Lys	Pro	Asp	Asp	Glu	Lys	Ile	Ile	Glu	Phe	Leu
		290					295					300				
45	Cys	Glu	Glu	His	Asp	Phe	Ser	Lys	Asp	Arg	Val	Glu	Lys	Ala	Val	Glu
	305					310					315					320
	Lys	Leu	Lys	Ala	Gly	Met	Gln	Ala	Ser	Gln	Ser	Thr	Leu	Glu	Arg	Trp
					325					330					335	
50	Phe	Ser														
55	<210>	49														
	<211>	53														
	<212>	DNA														
60	<213>	synthetic														
	<400>	49														



cccgctctcgc tgggtgaaaag aaaaaccacc ctggcgccca atacgcaaac cgc 53

5 <210> 50  
 <211> 26  
 <212> DNA

10 <213> synthetic  
 <220><221> misc\_feature<222> (22)..(23)<223> misc. feature  
 <220><221> misc\_feature<222> (1)..(2)<223> misc. feature  
 15 <220><221> misc\_feature<222> (2)..(3)<223> misc. feature  
 <400> 50

20 tntnccagag cctaatttgc cagtna 26

<210> 51

25 <211> 26  
 <212> DNA  
 <213> synthetic

30 <220><221> misc\_feature<222> (1)..(2)<223> misc. feature  
 <220><221> misc\_feature<222> (2)..(3)<223> Misc. Feature  
 35 <220><221> misc\_feature<222> (22)..(23)<223> Misc. Feature  
 <400> 51

40 tntnccagag cctaatttgc cagtna 26

<210> 52  
 <211> 24

45 <212> DNA  
 <213> synthetic

50 <220><221> misc\_feature<222> (22)..(23)<223> misc. feature  
 <400> 52

55 ttccagagcc taatttgcca gttna 24

<210> 53  
 <211> 24

60 <212> DNA

```

    <213>  synthetic
    <220><221>  misc_feature<222>  (22)..(23)<223>  misc. feature
5    <400>  53
    ttccagagcc taatttgcca gtna                                     24

10   <210>  54
    <211>  25
    <212>  DNA
15   <213>  synthetic
    <400>  54
20   cttaccaacg ctaacgagcg tcttg                                     25

    <210>  55
25   <211>  14
    <212>  DNA
    <213>  synthetic
30   <400>  55
    gctcccgcag acac                                             14

35   <210>  56
    <211>  15
40   <212>  DNA
    <213>  synthetic
    <220><221>  misc_feature<222>  (1)..(2)<223>  misc. feature
45   <400>  56
    tntacgccac cagct                                           15

50   <210>  57
    <211>  12
55   <212>  DNA
    <213>  synthetic
    <400>  57
60   cgctgtctcg ct                                             12

```

	<210>	58	
	<211>	19	
5	<212>	DNA	
	<213>	synthetic	
	<400>	58	
10		gctcaaggca ctcttgccc	19
	<210>	59	
15	<211>	63	
	<212>	DNA	
20	<213>	synthetic	
	<400>	59	
		atgactgaat ataaacttgt ggtagttgga gctggtggcg taggcaagag tgccttgacg	60
25		ata	63
	<210>	60	
30	<211>	45	
	<212>	DNA	
35	<213>	synthetic	
	<400>	60	
		tttttttttta attaggctct ggaaagacgc tcgtgaaacg agcgt	45
40	<210>	61	
	<211>	14	
45	<212>	DNA	
	<213>	synthetic	
50	<400>	61	
		cttcggagtt tggg	14
55	<210>	62	
	<211>	16	
	<212>	DNA	
60	<213>	synthetic	

```

    <220><221>  misc_feature<222>  (1)..(2)<223>  misc. feature
    <400>  62
5      ancttcggag tttggg                                     16

    <210>  63
10     <211>  16
    <212>  DNA
    <213>  synthetic
15     <220><221>  misc_feature<222>  (1)..(2)<223>  misc. feature
    <400>  63
20     cncttcggag tttggg                                     16

    <210>  64
    <211>  16
25     <212>  DNA
    <213>  synthetic
30     <220><221>  misc_feature<222>  (1)..(2)<223>  misc. feature
    <400>  64
35     gncttcggag tttggg                                     16

    <210>  65
    <211>  16
40     <212>  DNA
    <213>  synthetic
45     <220><221>  misc_feature<222>  (1)..(2)<223>  misc. feature
    <400>  65
50     tncttcggag tttggg                                     16

    <210>  66
    <211>  25
55     <212>  DNA
    <213>  synthetic
60     <400>  66
      gggttgtgga gtgagtgttc aagta                                     25

```

5 <210> 67  
 <211> 27  
 <212> DNA  
 <213> synthetic  
 10 <400> 67  
 ccataccta acgactcact atagggc 27  
 15 <210> 68  
 <211> 21  
 <212> DNA  
 20 <213> synthetic  
 <400> 68  
 25 ctcatacagt tacttgtctt c 21  
 <210> 69  
 30 <211> 489  
 <212> RNA  
 <213> Homo sapiens  
 35 <400> 69  
 gaacucacua uaggggcucga gcggccgccc gggcaggucc gccaccaaaa ugcagauuuu 60  
 40 cgugaaaacc cuuacgggga agaccaucac ccucgagguu gaaccucugg auacgauaga 120  
 aaauguaaag gccaaagucc aggauaagga aggaauuccu ccugaucagc agagacugau 180  
 cuuugcuggc aagcagcugg aagauggacg uacuugucu gacuacaaua uucaaaagga 240  
 45 gucuacucuu caucuugugu ugagacuucg ugguggugcu aagaaaagga agaagaaguc 300  
 uuacaccacu cccaagaaga auaagcaca gagaaagaag guuaagcugg cuguccugaa 360  
 50 auauuauaag guggaugaga auggcaaaau uagucgccuu cgucgagagu gcccuucuga 420  
 ugaauuggu gcuggggugu uuauggcaag ucacuuugac agacauuuu guggcaaauug 480  
 uugucugac 489  
 55 <210> 70  
 <211> 52  
 60 <212> DNA

<213> synthetic  
 <400> 70  
 5 ggaatacgac tcactatagg gaaagtctct gccgcccttc tgtgcctgct gc 52  
 <210> 71  
 10 <211> 52  
 <212> DNA  
 <213> synthetic  
 15 <400> 71  
 ggaatacgac tcactatagg gaaagtctct gccgcccttc tgtgcctgct gc 52  
 20 <210> 72  
 <211> 647  
 25 <212> RNA  
 <213> synthetic  
 <400> 72  
 30 gggaaaguc cugccgccc ucugugccug cugcucauag cagccaccuu cauuccccaa 60  
 gggcucgcuc agccagaugc aaucaaugcc ccagucaccu gcuguuauaa cuucaccaau 120  
 35 aggaagaucu cagugcagag gcucgcgagc uauagaagaa ucaccagcag caaguguccc 180  
 aaagaagcug ugaucuucaa gaccauugug gccaaaggaga ucugugcuga cccaagcag 240  
 aaguggguuc aggauuccau ggaccaccug gacaagcaaa ccaaaccucc gaagacuuga 300  
 40 acacucacuc cacaacccaa gaucugcag cuaacuauu uuccccuagc uuuccccaga 360  
 caccuguuu uauuuuuuu uaaugaauuu uguuuguuga ugugaaacau uaugccuuua 420  
 45 guaauguuaa uucuuuuua aguuaugau guuuuaaguu uaucuuuau gguacuagug 480  
 uuuuuuagau acagagacuu ggggaaauug cuuuuccucu ugaaccacag uucuaacccu 540  
 gggauuuuu gagggucuuu gcaagaauca uuaauacaaa gaauuuuuuu uaacauucca 600  
 50 augcaugcu aaaauuuau uguggaaaug aaauuuuugu aacuuuu 647  
 <210> 73  
 55 <211> 16  
 <212> DNA  
 <213> synthetic  
 60 <400> 73

	ttcttcggag tttggg	16
5	<210> 74 <211> 26 <212> DNA	
10	<213> synthetic <400> 74	
15	ccgtcacgcc tccttcggag tttggg	26
20	<210> 75 <211> 24 <212> DNA <213> synthetic	
25	<400> 75	
30	aacccaaact ccgaaggagg cgtg	24
35	<210> 76 <211> 29 <212> DNA <213> synthetic	
40	<400> 76	
45	gcgcagtgag aatgaggagg cgtgacggt	29
50	<210> 77 <211> 17 <212> DNA <213> synthetic	
55	<220><221> misc_feature<222> (1)..(2)<223> misc. feature <400> 77	
60	cntcattct cagtgcg	17
	<210> 78 <211> 30 <212> DNA	

<213> synthetic  
 <400> 78  
 5 aacgaggcgc acctttacat tttctatcgt 30  
 <210> 79  
 10 <211> 24  
 <212> DNA  
 <213> synthetic  
 15 <400> 79  
 ccttccttat cctggatctt ggca 24  
 20 <210> 80  
 <211> 24  
 25 <212> DNA  
 <213> synthetic  
 <400> 80  
 30 acgatagaaa atgtaaaggt gcgc 24  
 <210> 81  
 35 <211> 29  
 <212> DNA  
 <213> synthetic  
 <400> 81  
 40 cggaagaagc aagtgggtgcg cctcgttaa 29  
 45 <210> 82  
 <211> 16  
 50 <212> DNA  
 <213> synthetic  
 55 <220><221> misc\_feature<222> (1)..(2)<223> misc. feature  
 <400> 82  
 gncacttgct tcctcc 16  
 60 <210> 83



	<211>	14	
	<212>	DNA	
5	<213>	synthetic	
	<400>	83	
10	gctcccgcag acac		14
	<210>	84	
	<211>	30	
15	<212>	DNA	
	<213>	synthetic	
20	<400>	84	
	caaagaaaag ctgcgtgatg atgaaatcgc		30
25	<210>	85	
	<211>	50	
	<212>	DNA	
30	<213>	synthetic	
	<400>	85	
35	gaaggtgtct gcgggagccg atttcatcat cacgcagctt ttctttgagg		50